



# G.C.E Advanced Level Agricultural Science Revision Exercises



Department of Technology Education  
Faculty of Science & Technology  
National Institute of Education  
Maharagama  
Sri Lanka  
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GCE Advanced Level

Grade 12-13

# Agricultural Science

Revision Exercises



Department of Technology Education  
Faculty of Science Technology  
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Maharagama.

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Grade 12-13  
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## **Message of the Director General**

The education system of Sri Lanka is in the process of evolving into a knowledge based on Information Technology and Globalization when proceeding towards a knowledge economy there is need for an evolution procedure in order to confirm the actualization of the learning outcomes anticipated through the learning-teaching process by the students. The Question Bank might be considered an important aspect of this process of evolution.

Although model question and answers collections have been published most G.C.E. (A/L) subject , the model question and answers collections for agriculture could be inadequate level. It is hoped that this Agricultural Science Revision Exercises will serve to fill that gap to some extent.

This G.C.E. (A/L) Agricultural Science Revision Exercises has been prepared as a supplementary resource book by the Department of Technical Education of the National Institute of Education as a document to be used both by G.C.E. (A/L) Agricultural science teachers and students in order to raise the level of achievement in G.C.E. (A/L) Agricultural Science.

I would like to thank all professional and staff of the National Institute of Education for their academic contribution in making the task of preparing the G.C.E. (A/L) Agricultural Science Revision Exercises a success.

**Professor Gunapala Nanayakkara**

Director General

National Institute of Education

## **Preface**

I am delighted that the Faculty of Science and Technology of the National Institute of Education has been able to produce a Revision Exercises for G.C.E. (A/L) Agricultural Science. This Revision Exercises been prepared with a subject base so as to facilitate the expectations of students pursuing Agricultural Science in order to actualize their educational objectives. Through this the opportunity will be provided for the student him/herself to make a self assessment the extent to which one has assimilated the technological knowledge and the relevant skills especially of a subject that belongs to the technological subject stream.

With the help of this Revision Exercises teachers will be able to provide their students with forms of guidance, That is, they will be able to provide both feedback as well as feed forward. With the help of this Revision Exercises the student's weaknesses and inabilities can be identified and feedback provided to overcome them while through the identification of student strengths and abilities will assist in the provision of feed forward in order to further improve their abilities and strengths.

It would be quite effective if the students themselves could identify as to which competencies out of the competencies in the syllabus and to what level they had been able to actualize, for the success of the learning-teaching process. It is expected that the Revision Exercises will provide the opportunity for students themselves to assess their competency level on their own.

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## Introduction

In the preparation of this Revision Exercises care has been taken to ensure that all the 17 competencies in the syllabus are covered. Similarly a large number of subject related questions have been included in this question bank to ensure broad representation of the syllabus.

Provision has been made available in the Revision Exercises to inquire as to what extent the subject matter has been retained after the study of a particular competency. Similarly, the teacher too can, through this investigate the extent to which the subject matter taught had been learned by the students. It is expected that this document will support achievement of the objective above.

Although the G.C.E. (A/L) Agricultural Science Revision Exercises expects students to provide answers to 50 Multiple choice questions, Four structured essay type questions and four essay type questions, this Revision Exercises carries these types of questions separately. Further, since definitions are important in answering essay questions, definitions have been included separately in this document.

When making use of this Revision Exercises, the student should answer the questions first and check ones answers against the answers provided such suggestions should be communicated to the Department of Technical Education.

Department of Technical Education,  
Faculty of Science & Technology,  
National Institute of Education.

## Curriculum Themes

1. Agricultural Development in Sri Lanka.
2. Environmental Impact on crop cultivation.
3. Effect of soil environment on crop cultivation.
4. Plant Nutrition.
5. Land Preparation.
6. Irrigation and drainage.
7. Plant Propagation.
8. Plant Breeding.
9. Control of Environmental condition in crop cultivation.
10. Plant physiology.
11. Pest Management.
12. Post Harvest Technology.
13. Home garden , Paddy Farming.
14. Animal Husbandary.
15. Food Nutrition.
16. Environmental Friendly Agriculture.
17. Agricultural Economics.

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# **MULTIPLE CHOICE QUESTIONS**



## **1. The Development of Agriculture in Sri Lanka**

1. Per capita Gross National Product means, the value derived by dividing,
  - (1) gross national product by employees in the country .
  - (2) gross national product by per capita income.
  - (3) gross national product by the population.
  - (4) gross national product by daily turnover of the share market.
  - (5) gross national product by foreign exchange reserve.
  
2. The largest tank built during the Rajarata irrigation civilization is,
  - (1) Parakrama Samudraya.                      (2) Senanayake Samudraya.
  - (3) Kalawewa tank.                              (4) Basawakkulama tank.
  - (5) Minneriya tank.
  
3. The national agricultural policy to promote local food crop production was initiated in,
  - (1) 1991              (2) 1998      (3) 2001      (4) 2007      (5) 2013
  
4. The Sri Lanka National Plant Quarantine Services was established at,
  - (1) Gannoruwa.              (2) Katunayake.                      (3) Polonnaruwa.
  - (4) Hambantota.              (5) Mahailuppallama.
  
5. The district that has the highest number of water tanks is,
  - (1) Ampara.              (2) Batticaloa.                      (3) Moneragala.
  - (4) Anuradhapura.              (5) Rathnapura.
  
6. A gradual decrease in the contribution of the agriculture sector to the Gross Domestic Product has been noticed. The main reason for this is,
  - (1) a majority of the products produced by the agriculture sector are imported.
  - (2) the decrease in labour engaged in the agriculture.
  - (3) utilization of agricultural lands for other industries.
  - (4) unavailability of a market which gives a reasonable price for the agricultural products.
  - (5) rapid development of the industrial and the service sector than the agriculture sector .
  
7. The ascending order of the contribution of different sectors to the Sri Lankan Gross Domestic Product is,
  - (1) Services<Industries<Agriculture.              (2) Services<Agriculture<Industries.
  - (3) Industries<Services<Agriculture.              (4) Agriculture<Industries<Services.
  - (5) Agriculture<Services<Industries.
  
8. Before starting a harmful industry to environment, an Environmental Impact Assessment Report and the approval should be obtained from,
  - (1) Central Environmental Authority.              (2) Ministry of Environment.
  - (3) Department of Forest Conservation.              (4) Ministry of Wildlife.
  - (5) Department of Tourism.

***(A/L) Agricultural Science - Multiple Choice Questions and Answers***

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9. An Artificial Insemination Center related to Sri Lankan animal husbandry is situated at,  
(1) Kundasale. (2) Gannoruwa. (3) Peradeniya.  
(4) Pilimathalawa. (5) Kandy.
10. The organization that contributes to the farmers' pension scheme is,  
(1) Department of Agriculture.  
(2) Hector Kobbakaduwa Agrarian Research and Training Institute.  
(3) Council for Agriculture Research Policy.  
(4) Department of Agrarian Services.  
(5) Agricultural and Agrarian Insurance Board.
11. The largest reservoir under the Accelerated Mahaweli Project is,  
(1) Kothmale. (2) Maduruoya. (3) Victoria.  
(4) Rantambe. (5) Randenigala.
12. Which group of the foods contains the main food items imported to Sri Lanka,  
(1) green gram, rice and sugar. (2) wheat flour, sugar and milk powder.  
(3) milk powder, chillies and green gram. (4) rice, coconut oil and sugar.  
(5) sugar, chillies and milk powder.
13. The headquarters of Food and Agriculture Organization is situated in,  
(1) Washington. (2) Geneva. (3) Paris.  
(4) Rome. (5) London.
14. The international organization that is established to improve the nutritional status and the standards of living of member countries is,  
(1) World Food and Agriculture Organization. (2) World Health Organization.  
(3) UNESCO. (4) World Food Programme.  
(5) Red Cross Organization.
15. Out of total Sri Lankan milk requirement, the current national milk production is approximately,  
(1) 15%. (2) 20%. (3) 50%. (4) 60%. (5) 75%.
16. Out of the total land extent cultivated in Sri Lanka, the highest land extent is utilized for,  
(1) paddy cultivation. (2) tea cultivation. (3) rubber cultivation.  
(4) coconut cultivation. (5) pepper cultivation.
17. A few statements related to the Sri Lankan Agriculture sector are stated below:  
A – 70% of the rural community is engaged in agriculture  
B – Out of the total employments, the agricultural sector employees are 45%  
C – The contribution of the agriculture sector to the Gross Domestic Product is around 12%

The correct statement/s from the above is/ are,

- (1) A only. (2) B only. (3) C only.  
(4) A and B only. (5) A and C only.

***(A/L) Agricultural Science - Multiple Choice Questions and Answers***

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18. Per capita rice consumption in Sri Lanka is,  
(1) 58 kg. (2) 87 kg. (3) 98 kg. (4) 114 kg. (5) 137 kg.
19. The most prosperous era in the history of agriculture in Sri Lanka is,  
(1) The era of King Parakramabahu the great and King Mahasen's era.  
(2) King Wijaya's era and King Parndukabhaya's era.  
(3) King Dhatusena's era and King Nishshinkaralla's era.  
(4) King Dutugamunu's era and King Parndukabhaya's era.  
(5) King Devanampiyatissa's era and king Wasaridha's era.
20. The first multipurpose development project implemented in Sri Lanka is the,  
(1) Walawe River Project. (2) Galoya Project.  
(3) Polgolla Tum. (4) Kotmale Project.  
(5) Kaluganga Project.
21. The province that gives the highest contribution to the paddy cultivation in Sri Lanka is,  
(1) North Western. (2) Eastern. (3) Uva.  
(4) North Central. (5) Nothem.
22. Which answer includes only the areas where the rice research institutes are located ?  
(1) Lambuduwa, Bombuwala, Ambalantota.  
(2) Bombuwala, Bandarawela, Kamburupitiya.  
(3) Samanthurai, Bentota, Gannoruwa.  
(4) Batalagoda, Mahailuppallama, Matale.  
(5) Horana, Batalagoda, Kandy.
23. Under the agreement of the World Trade Organization (WTO), The following mentioned decisions have been taken,  
A - Reduction of duty free up to 80%  
B - Establishment of access to the market  
C - Removal of barriers other than duty free  
D - Requirement of a hygienic quality standard certificates for export products
- The correct statements from the above are,  
(1) B and D only. (2) A, B and C only. (3) A, B and D only.  
(4) A, C and D only. (5) B, C and D only.
24. The World Meteorological Organization is in,  
(1) New York. (2) Washington. (3) Geneva. (4) Rome. (5) London.
25. Which answer shows that all the reservoirs were built under the Mahaweli Development Programme ?  
(1) Senanayake Samudraya, Udawalawa, Kotmale and Randenigala.  
(2) Udawalawe, Polgolla, Lunugamvehera and Randenigala.  
(3) Lunugamvehera, Galoya, Rathkinda and Maduru oya.  
(4) Kotmale, Randenigala, Victoria and Rantambe.  
(5) Chandrika tank, Senanayake Samudraya, Maduru oya and Rantambe.

***(A/L) Agricultural Science - Multiple Choice Questions and Answers***

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26. The Sugar cane Research Institute of Sri Lanka is situated at,  
(1) Agalawatta. (2) Mahailuppallama. (3) Udawalawa.  
(4) Kundasale. (5) Thalawakele.
27. The limited factor in the dry zone agriculture in the past Sri Lanka is,  
(1) labour. (2) land. (3) water.  
(4) market facilities. (5) light.
28. The first tank built with the government sponsorship is,  
(1) Abhaya Wewa. (2) Thissa Wewa. (3) Nuwara Wewa.  
(4) Kala Wewa. (5) Minneriya Wewa.
29. In the past tanks were designed and were built ensuring the mutual relationships with the natural water sheds. This tank system is identified as,  
(1) Kingdom of irrigation tanks. (2) tank system.  
(3) Kuluwewa system. (4) village tank system.  
(5) cascade system.
30. In ancient times, tanks and irrigation systems were maintained and administered by the,  
(1) King.  
(2) consumers of irrigation water in a self-administrated manner.  
(3) irrigation management officers appointed by the King.  
(4) The King, the temple and people from rural organizations.  
(5) water tax officers.
31. 'Yoda Ela' is an unique engineering construction in irrigation. A few statements related to this are given below.  
A - I was designed to carry water from Kalawewa tanks which was situated lower level to Thissa Wewa situated at the higher level.  
B - The first 17 miles of yoda ela was designed in a way the slope was 6 inches per miles  
C - Did not contribute much to ground water recharge.
- The most correct statement/s out of the above statement is/are,  
(1) A only. (2) B only. (3) A and B only.  
(4) A and C only. (5) B and C only.
32. The speciality of the cascade system is that,  
(1) it starts with a small tank, gradually gets larger and ends with a major tank.  
(2) the major tank feeds all the small tanks.  
(3) all the small tanks feed the major tank separately.  
(4) The area of a tank is the watershed of the tank situated below.  
(5) the entire silt of the minor tanks are deposited in the major tanks.
33. A few statements about the agriculture in the past in Sri Lanka are given below:  
A - The written history and the archeological evidence prove that Sri Lanka had a self-sufficient agricultural economy in the past.  
B - The harvests were taken in three seasons in the past according to the Thonigala Inscription.  
C - Sri Lanka had been named as the Granary of Asia.

***(A/L) Agricultural Science - Multiple Choice Questions and Answers***

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The most correct statement with regard to the above statements is,

- (1) A and C statements are correct whereas B is incorrect.
  - (2) A is correct while C describes it.
  - (3) A and B are correct while C further describes them.
  - (4) B and C are correct and A describes it.
  - (5) A and B are correct whereas B describes A.
34. A student has observed that Kurubuk, Watakeyya, Maranda and Mee trees are grown in the upper regions of the irrigation tanks. One of the main objectives of growing these trees is to,
- (1) provide the protection to the tank at the border .
  - (2) create a cool environment around the tank.
  - (3) absorb the hazardous materials found in water .
  - (4) absorb the excess water in the tank.
  - (5) maintain the forest cover .
35. Bethma method means,
- (1) the provision of water to cultivate only a part of the paddy fields when the water is scarce.
  - (2) transferring the ownership of the paddy field to an another person temporarily .
  - (3) cultivation done from the irrigation water only .
  - (4) cultivation done by using the excess water of the tank.
  - (5) regaining the land lost due to the barren land act.
36. Fluctuation of the prices of the agricultural products adversely affects the consumer and the farmer .The methods to be adopted to prevent this are,
- (1) introducing new technology, following the certified price method and improving the gene pool.
  - (2) using the post-harvest technology, improving the gene pool, expanding the extension services and improving the storage facilities.
  - (3) using the correct post-harvesting techniques, implementing the certified price method and improving the storage facilities.
  - (4) using the improved varieties, introducing new technology and insurances.
  - (5) providing subsidies, expanding extension services and following the certified price method.
37. A few policy objectives of sustainable agriculture are given below .
- A – It is aimed at improving the local agriculture.
- B – It is aimed to be implemented as the precautions in planning sustainable economic activities to alleviate poverty .
- C – It is aimed to improve the food security to find solution to the issues like unemployment and marketing through the environment friendly technology .

From the above mentioned statements, the most correct statement/s is/ are,

- (1) B only.
  - (2) C only.
  - (3) A and B only.
  - (4) A and C only.
  - (5) B and C only.
38. The organization responsible for the prevention of converting paddy land to the other purposes is,
- (1) Central Environment Authority.
  - (2) Department of Agriculture.
  - (3) Agrarian Services Centre.
  - (4) Farmer Organization.
  - (5) Agriculture & Agrarian Insurance Board.

***(A/L) Agricultural Science - Multiple Choice Questions and Answers***

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39. The objective of the plant quarantine act is to prevent various pest and diseases entering Sri Lanka. The authorized individual in this regard is,
- (1) The director General of the Plant Quarantine Services.
  - (2) The director of the Entomology Division of the Department of Agriculture.
  - (3) The director of Plant Pathology Institute.
  - (4) The director General of the Department of Agriculture.
  - (5) The director of Pesticide Secretariat.

40. The names of a few crops are given below:  
Sugar cane, Cinnamon, Rubber, Pepper, Coconut

For the above crops, research institutes are situated respectively at,

- (1) Sevanagala, Matale, Lunuvila, Agalawatta and Melsiripura.
  - (2) Agalawatta, Kamburupitiya, Matale, Thalawakele and Bombuwala.
  - (3) Udawalawa, Kamburupitiya, Matale, Agalawatta and Lunuvila.
  - (4) Udawalawa, Kamburupitiya, Agalawatta, Rathnapura and Lunuvila.
  - (5) Udawalawa, Kamburupitiya, Agalawatta, Matale and Lunuvila.
- The main components of a tank are given below. Answer the questions 41-43 based on them.
- |                              |                                      |
|------------------------------|--------------------------------------|
| A - Break water (Ralapanawe) | D - Aqueduct stone (Diyaketa pahana) |
| B - Sluice gate              | E - Spill gate                       |
| C - Silt trap (Bisכותuwa)    |                                      |
41. The important component that prevents the erosion of the bank is,  
(1) A.      (2) B.      (3) C.      (4) D.      (5) E.
42. Tank water is issued from,  
(1) A.      (2) B.      (3) C.      (4) D.      (5) E.
43. The important component for one to know about the water level of the tank is,  
(1) A.      (2) B.      (3) C.      (4) D.      (5) E.
44. The non-government organizations which provide agriculture services are,  
(1) UNDP, Sarvodaya, World Vision and Samurdhi Authority.  
(2) Sarvodaya, UNDP, Save the Children and World Vision.  
(3) CARE International, Sarvodaya, Samurdhi Authority and NAQDA.  
(4) Economic Centre, Sarvodaya, CARE International and World Vision.  
(5) NAQDA, Farmer Organization, CARE International and Sarvodaya.
45. The government organization which recommends the crops based on the agriculture research zones and produces the certified seeds is,  
(1) Department of Agrarian Services.      (2) Department of Irrigation.  
(3) Ministry of Economic Development.      (4) Department of Agriculture.  
(5) Agricultural Research Centres.

***(A/L) Agricultural Science - Multiple Choice Questions and Answers***

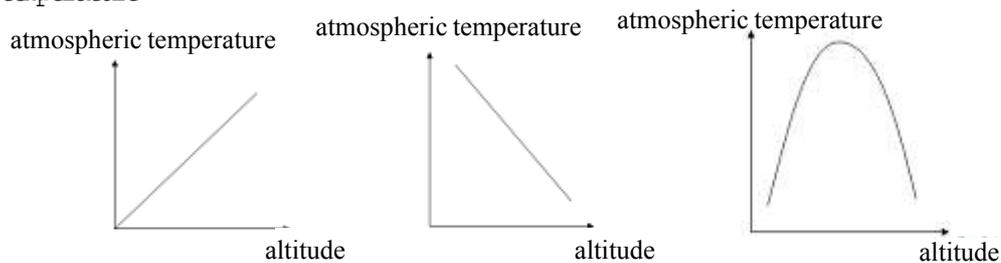
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46. The Sri Lankan Universities which have the faculties of agriculture are,  
(1) Peradeniya, Colombo, W ayamba and Ruhuna.  
(2) Rajarata, Ruhuna, Moratuwa and Jaffna.  
(3) Rajarata, W ayamba, Ruhuna and Eastern.  
(4) Sabaragamuwa, Kelaniya, Peradeniya and W ayamba.  
(5) Uva-wellassa, Jayawardenapura, Ruhuna and Rajarata.
47. The regions where the Training Centres for Animal Husbandry are located are,  
(1) Kotadeniyawa and Kandy. (2) Hambantota and Gannoruwa.  
(3) Mahailuppallama and Polonnaruwa. (4) Kotadeniyawa and Kekanadura.  
(5) Peradeniya and Udawalawa.
48. The world famous irrigation system built as a solution for the water scarcity in the Aurachapura region during the earlier kingdom is the,  
(1) Minipe canal. (2) Malwathu Oya.  
(3) Hamilton canal. (4) Maduru Oya.  
(5) Yoda canal.
49. If a farmer wants to get subsidies for his pepper cultivation, the most suitable officer he has to contact is a field officer of the,  
(1) Department of Agriculture.  
(2) Department of Agrarian Services.  
(3) Agriculture Development Authority.  
(4) Department of Export Agriculture.  
(5) Ministry of Agriculture.
50. A student stated that the following objectives are included in the National Agriculture Policy of Sri Lanka:  
A - Ensuring food and nutrition security  
B - Importing essential agricultural products  
C - Improving the living standard of the farming community
- From the above statements, the correct statement/s is/are,  
(1) A only. (2) C only. (3) A and B only.  
(4) A and C only. (5) B and C only.

## 2. Impact of climate change on crop cultivation

- Human activities affect different consequences in the components of hydrological cycle.  
The effect of mulching to the soil is to,  
(1) control transpiration. (2) reduce the rate of seepage.  
(3) control runoff. (4) change the plant cover.  
(5) control the evaporation.
- The rainfall mechanism that occurs as a result of severe changes in atmospheric pressure is known as,  
(1) convection process. (2) southwest monsoon process.  
(3) northeast monsoon process. (4) intertropical convergence process.  
(5) climatic systems.
- The wind speed of a certain place in the wet zone on a day in the month of December was 28–60km/hour. Floods occurred as the result of intense rains that came with high wind. The rainfall mechanism described in this phenomena was the,  
(1) southwest monsoon. (2) northeast monsoon.  
(3) convection process. (4) climatic systems..  
(5) southwest monsoon and convection process.
- The annual rainfall of a certain region is 3,250mm and the altitude is 600m. The Agro-climatic zone of this region is,  
(1) Low country wet zone. (2) Mid country wet zone.  
(3) Up country wet zone. (4) Up country intermediate zone.  
(5) Mid country intermediate zone.

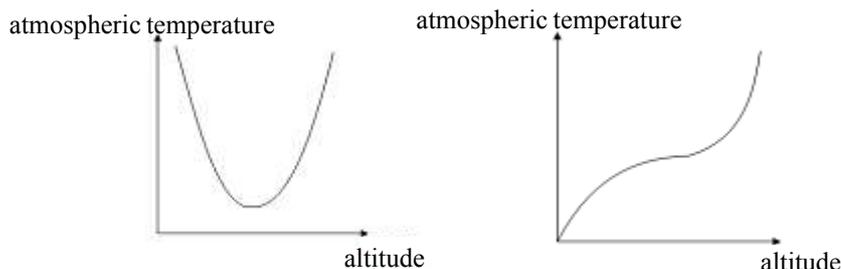
- What is the best graph representative of the relationship between altitude and atmospheric temperature



(1)

(2)

(3)



(4)

(5)

**(A/L) Agricultural Science - Multiple Choice Questions and Answers**

6. Which of the table below correctly indicates the weather instrument and the weather variable that it measures,

	<b>Instrument</b>	<b>Weather variable measured</b>
(1)	Thermometer Wind vane	Relative Humidity Wind direction
(2)	Thermometer Wind vane	Wind direction Relative Humidity
(3)	Barometer Thermometer	Wind speed Relative humidity
(4)	Barometer Wind vane	Wind speed Air pressure
(5)	Barometer Thermometer	Air pressure Wind speed

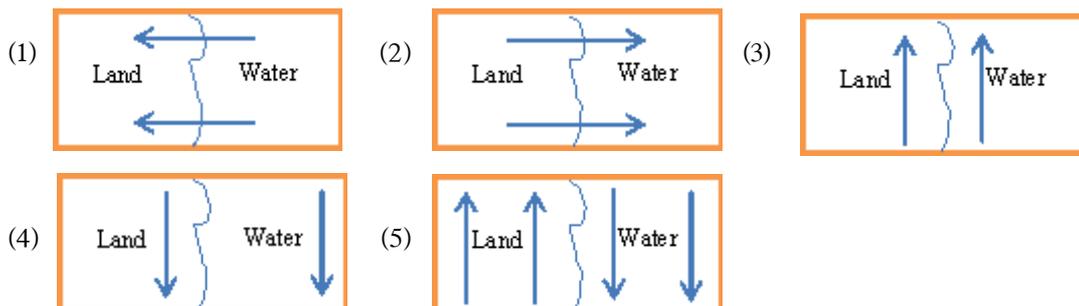
7. The curving of planetary wind is the result of the,

- (1) earth's rotation on its axis.
- (2) unequal heating of the earth's atmosphere.
- (3) unequal heating of the earth's surface.
- (4) earth's gravitational pull on the moon.
- (5) earth's tilt by  $23.4^{\circ}$

8. The air above the earth's surface is heated and rises. Which table correctly identifies the type of heat transfer within the rising air and the change in air density above the heated earth's surface?

	<b>Type of heat transfer</b>	<b>Change in air density</b>
(1)	Conduction	Density increases
(2)	Convection	Density increases
(3)	Conduction	Density increases
(4)	Convection	Density decreases
(5)	Radiant heat	Density decreases

9. Adjacent water and landmasses are heated by the morning on a clear, calm day. After a few hours, a surface wind develops. Which figure best represents the wind's direction.



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10. The main reason for the heating of the earth's atmosphere is,
- (1) inability to emit heated air from the atmosphere since it is similar to a green house.
  - (2) molecules in the atmosphere absorb radiation, gets heated and retains as heat.
  - (3) emission heat by burning fossil fuels.
  - (4) release of carbon dioxide on plants.
  - (5) release of carbon dioxide as a by product of respiration of living organisms on earth.

11. Out of the following cultivations, the highest CH<sub>4</sub> emitting crop cultivation is,
- (1) Sugarcane cultivation.
  - (2) Paddy cultivation.
  - (3) Upcountry vegetable cultivation.
  - (4) Pasture cultivation.
  - (5) Mahogany plantations.

12. The most affecting factor for coriolis effect is,
- (1) wind movement
  - (2) rotation of the earth.
  - (3) depressions in the atmosphere.
  - (4) friction of the earth.
  - (5) fluctuations in lower levels of atmosphere.

13. The coriolis force mostly affect on,
- (1) global warming.
  - (2) El Niño and La Niña phenomenae.
  - (3) global wind pattern.
  - (4) climate change.
  - (5) green house effect.

14. When a climatic condition develops to a cyclonic situation
- A – Cyclonic conditions are not developed close to the equator
- B – Coriolis power should not reach zero.

From the above statements,

- (1) A is correct and B is incorrect.
- (2) A is incorrect and B is correct.
- (3) A is correct and B explains A.
- (4) Both A and B are incorrect.
- (5) B is correct and A explains B.

15. A few statements on climate and weather are given below
- A – Short term atmospheric condition is called weather
- B – Evaporation is a climatic factor
- C – Climate is the situation identified after studying long term data of weather variables

From the above statements, the correct statement/s is/are,

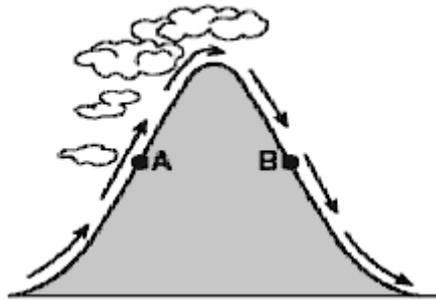
- (1) A only.
- (2) B only.
- (3) C only.
- (4) A and B only.
- (5) A and C only.

16. Ozone is concentrated in the atmosphere at an altitude of 20 km – 35km. The atmospheric layer that contains the greatest concentration of ozone is,
- (1) mesosphere.
  - (2) thermosphere.
  - (3) troposphere.
  - (4) stratosphere.
  - (5) ionosphere.

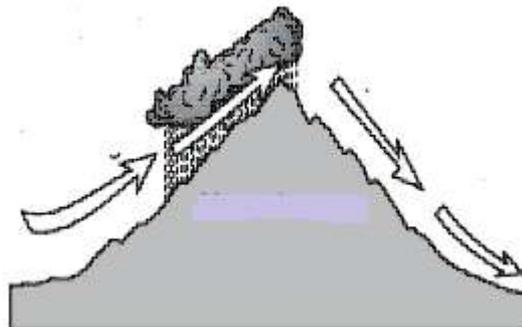
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17. The reason for presence of the wet climate on the windward side of a mountain is the, rising air,
- (1) compresses and cools causing the water droplets to evaporate.
  - (2) compresses and cools causing the water droplet to condense.
  - (3) expands and cools causing the water vapour to condense.
  - (4) expands and warms causing water droplets to evaporate.
  - (5) expands and cools causing water droplet to evaporate.
18. Solar radiation is more efficiently absorbed by,
- (1) grassylands.
  - (2) fresh snow.
  - (3) marshy lands.
  - (4) sand.
  - (5) forests.
19. The main factor that leads to the presence of different annual average temperatures in two different cities is
- (1) rotation of the earth.
  - (2) duration of insolation.
  - (3) distance from a large body of water.
  - (4) direction of prevailing winds.
  - (5) speed of prevailing winds.
20. The following diagram shows the direction of prevailing winds across a mountain range. A and B are two points at the same altitude of a mountain on opposite directions.



- Air temperature and relative humidity at point B compared to that of A is
- (1) cool and dry.
  - (2) warm and highly moist.
  - (3) cool and highly moist.
  - (4) warm and dry.
  - (5) warm and moist.
21. The diagram shows how prevailing winds cause different weather conditions on the windward and leeward sides of a mountain range.





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29. The Greenhouse effect leads to warming the surface of the earth and the,  
(1) troposphere.                      (2) mesosphere.                      (3) stratosphere.  
(4) thermosphere                      (5) ionosphere
30. The best definition for weather in a certain place is, the change in the atmospheric pressure of the area over,  
(1) one hour.                      (2) one day.                      (3) one week.  
(4) one month.                      (5) a long period.
- The table given below is used to calculate relative humidity using dry and wet bulbs. Answer question numbers 31 and 32 using this table.

Dry bulb reading ( $^{\circ}\text{C}$ )	Temperature difference ( $^{\circ}\text{C}$ )					
	0.5	1.0	1.5	2.0	2.5	3.0
30	96	93	89	85	82	78
29	96	92	89	85	81	78
28	96	92	88	85	81	77
27	96	92	88	84	81	77
26	96	92	88	84	80	76

31. If the dry bulb and the wet bulb readings are  $28^{\circ}\text{C}$  and  $26^{\circ}\text{C}$  respectively at location 'A' the relative humidity of the location A is,  
(1) 77%.                      (2) 81%.                      (3) 85%.                      (4) 88%.                      (5) 96%.
32. The dry bulb and the wet bulb readings are  $28^{\circ}\text{C}$  and  $27^{\circ}\text{C}$  respectively at the location 'B'. If the relative humidity of location 'A' compares to the relative humidity of location 'B'. The answer is,  
(1) equal.  
(2) lower.  
(3) greater.  
(4) greater at the beginning and becomes lower afterwards.  
(5) lower at the beginning and becomes greater afterwards.
33. If a land of one hectare gets 20mm rainfall, the total volume of water received on the land in cubic meters is,  
(1) 2.                      (2) 20.                      (3) 50.                      (4) 200.                      (5) 500.
34. The diameter of a rain gauge at a weather station is 12cm. The amount of rainfall collected in it on a certain morning was  $72\text{ cm}^3$ . The amount of rainfall received on that area in millimeters is,  
(1) 0.063                      (2) 0.63                      (3) 6.3                      (4) 63.0                      (5) 630.
35. The amount of rainfall collected on a certain day in a rain gauge installed in the school ground is  $18\text{ cm}^3$ . If the diameter of the funnel of the rain gauge is 12.7cm. The amount of rainfall received to that area in millimeters is,  
(1) 0.035                      (2) 0.142                      (3) 0.355                      (4) 1.42                      (5) 13.55

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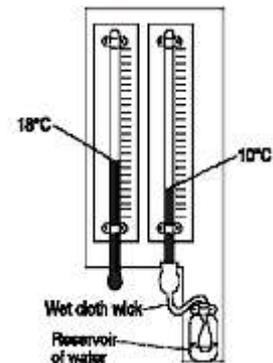
36. The statements given below shows how several different climatic factors effect on the crop harvest
- A - Affects on the development of pigments of the crops
  - B - Affects the composition of the fruit juices such as Pineapple
  - C - Affect on the factors affecting susceptibility to the fungal diseases
  - D - Affects the solubility of solids in the harvest

The climatic factors affecting A,B,C and D in the above conditions respectively indicate,

- (1) temperature, relative humidity, rainfall and light.
  - (2) rainfall, relative humidity, temperature, light.
  - (3) light, rainfall, relative humidity, temperature.
  - (4) temperature, light, relative humidity, rainfall.
  - (5) light, relative humidity, temperature, rainfall.
37. A few statements on photoperiodism of plants are given below.
- A - Flowering of short day plants is stimulated by phytochrome P660.
  - B - P660 is a type of phytochrome that absorbs far red light.
  - C - Short lights are necessary in order to produce the phytochrome necessary to stimulate flowering in short day plants.
  - D - The hormone Florigine is necessary in order to stimulate flowering in plants.

The correct statement/s from the above is/are,

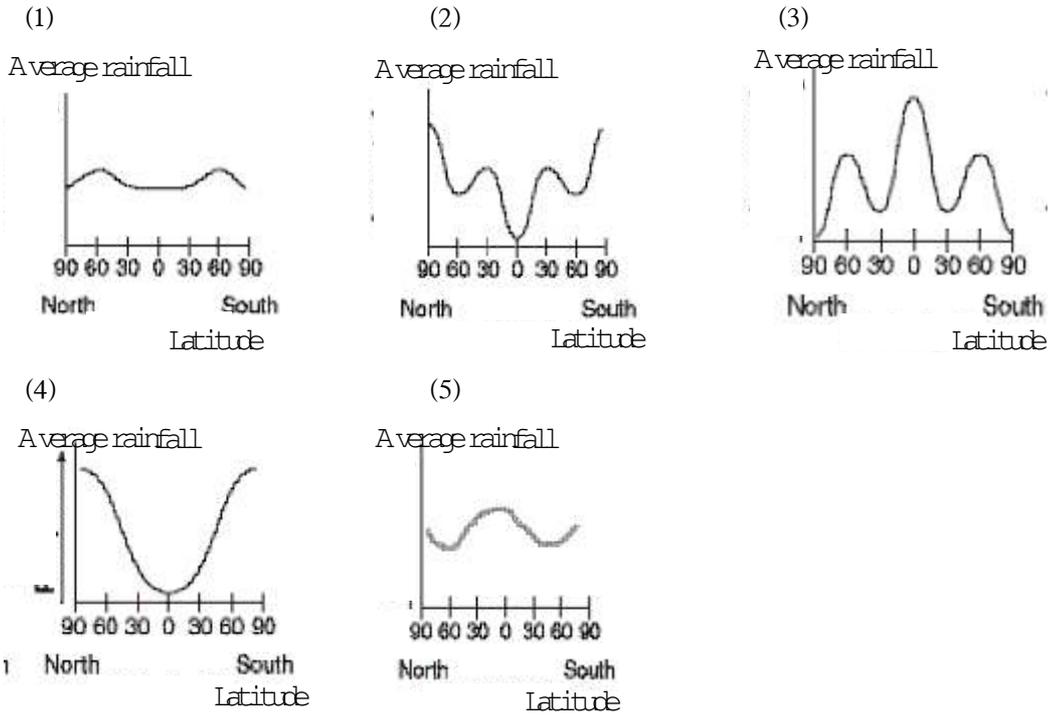
- (1) A and B only.
  - (2) A and C only.
  - (3) A and D only.
  - (4) B and C only.
  - (5) C and D only.
38. The relative humidity according to the diagram is,
- (1) 19%.
  - (2) 20%.
  - (3) 33%.
  - (4) 40%.
  - (5) 44%.



39. In a certain location, relative humidity is 85%. If the temperature of dry bulb thermometer indicate 10°C, the reading of the wet bulb thermometer is,
- (1) 15°C.      (2) 28°C.      (3) 29°C.      (4) 32°C.      (5) 55°C.

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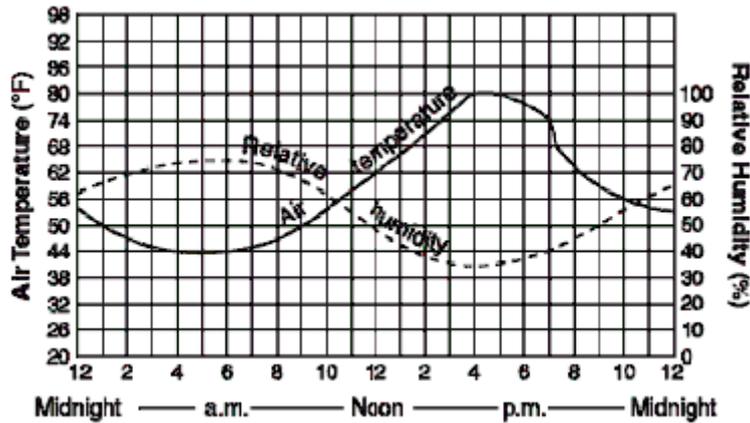
40. Which graph best shows the relationship between latitudes and average annual precipitation?



41. The climatic changes due to global warming is called as,

- (1) greenhouse effect.
- (2) variability of rainfall.
- (3) climate change.
- (4) variability of temperature.
- (5) weather changes.

• Questions 42 and 43 are based on the graph below.



42. According to the graph the change in relative humidity from 12 noon to 4 p.m. is,

- (1) 10%.    (2) 15%.    (3) 25%.    (4) 20%.    (5) 30%.

43. The highest evaporation rate exists at,

- (1) 6.00 a.m.    (2) 9.00 a.m.    (3) 10.00 a.m.    (4) 4.00 p.m.    (5) 11.00 p.m.



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49. When the inter tropical convergent zone presents in the middle part of the country, Sri Lanka will get,
- (1) Southwest monsoon rain.
  - (2) Northeast monsoon rain.
  - (3) Inter-monsoonal rain.
  - (4) Complete dry period.
  - (5) cyclonic rain.
50. Out of following, statements, the correct statement is,
- (1) When altitude increases by 100m the temperature decreases by  $10^{\circ}\text{C}$ .
  - (2) The optimum temperature for the most of the favourable microbes ranges from  $32^{\circ}\text{C}$  -  $38^{\circ}\text{C}$ .
  - (3) For the development of potato tubers, the night time temperature should be within  $25^{\circ}\text{C}$  -  $30^{\circ}\text{C}$ .
  - (4) Flowering in carrot can be induced by providing a temperature between  $0-10^{\circ}\text{C}$ .
  - (5) A tomato plant needs  $8-10^{\circ}\text{C}$  night temperature range for fruiting.

### 3. Impact of soil environment on crop cultivation

- The elements which comprise clay minerals are,
  - (1) Calcium and Aluminium.
  - (2) Sodium and Oxygen.
  - (3) Aluminium and Silicon.
  - (4) Silicon and Hydrogen.
  - (5) Sodium and Silicon.
- Two important factors which affect the weathering of rocks are,
  - (1) amount of carbon dioxide and acid rains.
  - (2) the acids which are secreted by plant roots and the climate.
  - (3) the climate and the soil carbon dioxide.
  - (4) type of rock and soil carbon dioxide.
  - (5) soil oxygen and activities of soil organisms.
- The process of weathering of rocks is speeded up and the soil genesis accelerates in,
  - (1) the granite rock on the top of the mountains.
  - (2) the sedimentary rocks in deserts.
  - (3) the metamorphic rocks in cold, dry climatic conditions.
  - (4) the sedimentary rocks in wet, warm climatic conditions.
  - (5) the sedimentary rocks in the mountain slope which face towards the north.
- The quantity of soil particles or soil texture decides,
  - (1) the fertility of the soil.
  - (2) whether top soil or subsoil.
  - (3) amount of air and water retention in the soil.
  - (4) the thickness of the soil stratum.
  - (5) the soil structure.
- The horizon B of the soil consists of,
  - (1) minor quantities of clay, silt and humus.
  - (2) humus.
  - (3) partially weathered rocks.
  - (4) top soil.
  - (5) humus and gravel.
- If the bulk density of a 100g of soil is  $2.65 \text{ gm}^{-3}$ , the volume of the soil particles is,
  - (1)  $0.265 \text{ cm}^3$ .
  - (2)  $2.65 \text{ cm}^3$ .
  - (3)  $3.77 \text{ cm}^3$ .
  - (4)  $26.5 \text{ cm}^3$ .
  - (5)  $37.7 \text{ cm}^3$ .
- Water movement from the soil solution through the micro pores is caused due to,
  - (1) adhesion force.
  - (2) capillary action.
  - (3) cohesion force.
  - (4) root pressure.
  - (5) evaporation.
- SI units Deci sieimens per meter is used to measure, the,
  - (1) water tension in the soil.
  - (2) strength of soil binding materials.
  - (3) quantity of heavy metals adsorbed by the soil.
  - (4) electrical conductivity of soil water.
  - (5) quantity of micro organisms of the soil water.

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9. In the development of soil profiles, the processes such as formation of the horizon C, from the R/D horizon and the development of B and C horizons from the A horizon is given in order ,
- (1) As weathering of rock and genesis of soil.
  - (2) As compaction of soil and genesis of soil.
  - (3) As genesis of soil and weathering of rock.
  - (4) As mineralization and weathering of rock.
  - (5) As genesis of soil and leaching.
10. In determining the texture of the soil using the Hydrometer method, the objective of adding Ammonium hydroxide and Hydrogen Ferroxide is to,
- (1) remove the organic matter and water .
  - (2) remove the organic matter and increase the pH value.
  - (3) break the binding agents and to remove organic matter .
  - (4) remove water in the soil and improve the soil structure.
  - (5) increase the pH value of soil and remove water in the soil.
11. The number of main colours in the Munsell colour chart which is used in determining soil texture is,
- (1) 3 .    (2) 4.            (3) 5.            (4) 6.            (5) 7.
12. SALT is a stands for ,
- (1) method of testing soil salinity .
  - (2) method of soil conservation.
  - (3) technical method of measuring physical properties of soil.
  - (4) area with marshy land.
  - (5) method of measuring productivity of agricultural land.
13. SALT stands for ,
- (1) Sloping Agricultural Land Technology.
  - (2) Sri lanka Agricultural Land Technology .
  - (3) Sri lanka Association of Land Technology .
  - (4) Society of Agricultural Labour Technology .
  - (5) Southern Agricultural Labour Technology .
14. If the cation exchange capacity of a soil is "a" cmol/kg and the exchangeable amount of Aluminium and Hydrogen ions is "b", the base saturation value of that soil is
- (1)  $\frac{a-b}{b} \times 100\%$  .            (2)  $\frac{a-b}{a} \times 100 \%$             (3)  $\frac{a}{a-b} \times 100\%$  .
- (4)  $\frac{b}{a-b} \times 100 \%$             (5)  $\frac{b}{a} \times 100 \%$
15. The pF value of a soil in the field capacity is,
- (1) 2.5    (2) 4.5            (3) 3.5            (4) 4.5            (5) 5.5
16. Soil colour is determined by using,
- (1) penetrometer .            (2) refractometer .            (3) BDH indicator .
  - (4) field tensiometer .            (5) Munsell colour chart.

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17. To remove soil alkalinity, use

- (1) Calcium Hydroxide.                      (2) Calcium Carbonate.  
(3) Calcium Sulphate.                      (4) Calcium Oxide.  
(5) Dolomite.

18. The equipment shown in the diagram is used to,

- (1) dig the soil.  
(2) obtain a soil sample.  
(3) measure the height of the soil profile.  
(4) manure the soil.  
(5) measure the compaction of the soil.



19. The major climatic factors affect the soil genesis are,

- (1) temperature and rainfall.                      (2) temperature and Relative Humidity.  
(3) rainfall and the wind velocity.                      (4) rainfall and light intensity.  
(5) temperature and wind velocity.

20. A type of igneous rock,

- (1) dolomite.                      (2) slate.                      (3) sand stones.  
(4) chert.                      (5) marble.

21. An example of a mineral of layer silicate is,

- (1) Mica.                      (2) Vermiculite.                      (3) Montmorillonite.  
(4) Chlorite.                      (5) Kaolinite.

22. The Percentage of volume of air in a standard soil is,

- (1) 5%.                      (2) 10%.                      (3) 20%.                      (4) 25%.                      (5) 50%.

23. The following three statements are based on the method that is used to determine the soil water content by using Gypsum block method.

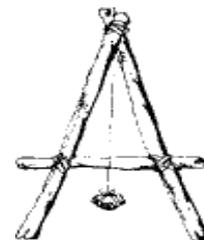
- A - Moisture content is measured using the relationship between the moisture content and the resistance to electrical conductivity,  
B - Moisture content of soil in different depths can be measured by placing Gypsum blocks at different soil depths.  
C - It can be used easily to determine the moisture content of high saline soil.

Out of three statements given above, the true statement /s is/are

- (1) A only.                      (2) B only.                      (3) A and B only.  
(4) A and C only.                      (5) B and C only.

24. The instrument shown in the diagram is used to,

- (1) mark contour lines.  
(2) determine the colour of the soil.  
(3) classify the type of soil.  
(4) determine the texture of the soil.  
(5) determine soil bulk density.



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25. The following statements are based on the bulk density of a soil
- A - Bulk density is less in a porous soil
  - B - Bulk density is high in a soil containing organic matter
  - C - Bulk density is high in a soil containing iron oxide

Out of the three statement/s, above the true statement/s is/are,

- (1) A only.
  - (2) B only.
  - (3) A and B only.
  - (4) A and C only.
  - (5) B and C only.
26. The type of the soil structure of the given diagram is,
- (1) blocky.
  - (2) prismatic.
  - (3) platy.
  - (4) columnar.
  - (5) granular.



Use the names of the following organisms for the question numbers from 27 to 29.

- A- *Eudrilus spp.*
  - B- *Nitrosomonas spp.*
  - C- *Pseudomonas denitrificans*
  - D- Nitrobacter
  - E- Nitrococcus spp.
27. The denitrification process of the soil is affected by,
- (1) A.
  - (2) B.
  - (3) C.
  - (4) D.
  - (5) E.
28. Vermi compost is composed by using,
- (1) A.
  - (2) B.
  - (3) C.
  - (4) D.
  - (5) E.
29. Conversion of  $\text{NO}_2^-$  into  $\text{NO}_3^-$  in the soil is affected by,
- (1) A.
  - (2) B.
  - (3) C.
  - (4) D.
  - (5) E.
30. Earth worms form cavities in the soil therefore,
- (1) soil nutrients are removed from the field.
  - (2) soil air, water movements and structure improved.
  - (3) it supports the photosynthetic autotrophic soil micro organisms.
  - (4) it gives a mechanical support for plant growth in optimal condition.
  - (5) it maintains the cation exchange and pH.
31. Some soil conservation methods are given below.
- A Preparation of terraces
  - B Preparation of soil according to nutrition
  - C Crop rotation
  - D Construction of ridges

Out of all methods given above, the agricultural method of soil conservation are,

- (1) A and B only.
- (2) A and C only.
- (3) A and D only.
- (4) B and C only.
- (5) A, B and C only.

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32. A few statements about humus are given below.

- A – The diameter is 0.002 nm.
- B– The cation exchange capacity.
- C – Crystalline shaped.
- D – Outer surface is negatively charged.

Out of the three statements above, the true statements are,

- (1) A and B only.
- (2) A and C only.
- (3) A and D only.
- (4) B and C only.
- (5) A, B and C only.

33. Leaching means,

- (1) percolation of minerals dissolved in soil solution, into the deep layers.
- (2) infiltration of rain water into the soil.
- (3) runoff irrigated water without entering into the soil.
- (4) evaporation of soil water in drought conditions.
- (5) absorption of soluble salts in the soil solution by plants.

34. Out of the following minerals given below, the secondary minerals are,

- (1) Quartz, Keolinite and Illite.
- (2) Feldspar, Illite and montmorillonite.
- (3) Quartz, Feldspar and Keolinite.
- (4) Keolinite, Montmorillonite and Illite.
- (5) Quartz, mica and vermiculite.

35. When the pH value of the soil is,

- (1) less than 4, iron toxicity occurs in the crop cultivation.
- (2) greater than 9, phosphorus availability is high.
- (3) between 4 – 5.5 availability of all the macro nutrients are high.
- (4) exactly 4, the functions of nitrogen fixation bacteria is greater.
- (5) exactly 9, copper and manganese can be obtained easily.

36. Select the most suitable statement which describes the soil structure of an undisturbed soil profile in the deeper layers,

- (1) small sub angular structures are in the below of the soil profile while surface layers contain big granular structures.
- (2) big sub angular structures are in the below while surface layers contain small prismatic structures.
- (3) prismatic structures are in the below while surface layers contain sub angular structures.
- (4) small granular structures are in the below while surface layers contain different structural shaped big aggregates.
- (5) big prismatic structures are in the below while surface layers contain small granular structures.

37. A crop which grows well in an acidic soil is,

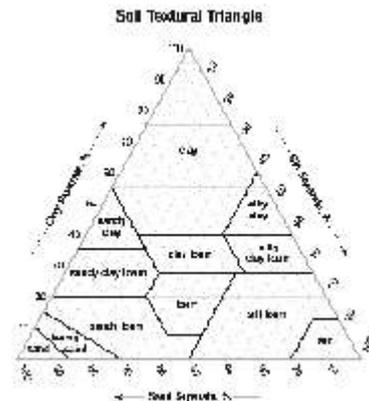
- (1) beans.
- (2) paddy.
- (3) Raji (Kurrakkan)
- (4) sugar cane.
- (5) tea.

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38. In the Munsell colour chart Hue, value and chroma are arranged respectively to denote,
- (1) colour combination, colour arrangement according to relative darkness of colours and the purity of the colour
  - (2) colour arrangement according to the relative darkness, colour combination and the purity of the colours.
  - (3) the purity of the colours, colour combination and the colour arrangement according to the relative darkness.
  - (4) the purity of the colours, colour combination and the colour intensity.
  - (5) colour combination, the purity of the colours and the colour intensity.
39. Weathering of Feldspar forms,
- (1) Montmorillonite.           (2) Keoline.                   (3) Illite
  - (4) Vermiculite.               (5) Chlorite.
40. A farmer has decided to grow leguminous crops, to increase the nitrogen amount of a soil which had been degraded can improve the soil Nitrogen amount by practicing the following step.
- (1) adding lime to the soil before the establishment of leguminous crops.
  - (2) adopting soil conservation methods before establishment of leguminous crops.
  - (3) inoculating the leguminous seeds before planting.
  - (4) double the amount of seeds as the amount of seed cultivated before.
  - (5) mulch the land and bring it to the field capacity after planting seeds.

• use the diagram below to answer the question

41. If a soil sample contains 20% silt, 60% sand and 20% clay. The textural class of the soil sample is,
- (1) sandy.
  - (2) loamy.
  - (3) sandy and loamy.
  - (4) clay.
  - (5) silty loam.

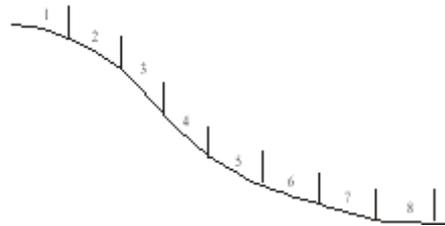


42. The reason for the change of true density of the soil is,
- (1) the way that the soil sample was obtained.
  - (2) the soil porosity ratio.
  - (3) the soil water percentage of the soil.
  - (4) soil sand percentage.
  - (5) the process of grinding the soil sample.
43. Parental material which effects on formation of a sandy soil is,
- (1) quartz                       (2) gneiss.                       (3) granite
  - (4) mica.                        (5) feldspar.
44. In the process of chemical weathering of rocks, conversion of  $Fe^{3+} \rightarrow Fe^{2+}$  is called,
- (1) oxidation.                       (2) reduction.                       (3) hydration.
  - (4) hydrolysis.                       (5) solution.

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45. The type of ions which highly affected the formation of basic soil is,  
(1)  $Fe^{2+}$       (2)  $Mg^{2+}$       (3)  $Ca^{2+}$       (4)  $H^+$       (5)  $Na^+$
46. The correct statement regarding the type of soil erosion,  
(1) The continuous gully erosion leads to rill erosion.  
(2) The sheet erosion is the initial phase of soil erosion.  
(3) normal land preparation methods cannot be applied to rehabilitate the gully erosion.  
(4) The continuous rill erosion leads to sheet erosion.  
(5) in rill erosion massive rills are formed in the land.
47. If the volume of solid matter of a soil is  $5\text{ cm}^3$  and the volume of water is  $2\text{ cm}^3$ , and the total volume is  $8\text{ cm}^3$  the porosity of the relevant soil is,  
(1) 25% .      (2) 37.5%.      (3) 62.5%.      (4) 75% .      (5) 87.5% .
48. A major portion of the cations in the soil are,  
(1) contributed to form soil colloids.  
(2) available in the soil solution.  
(3) tightly bound with the soil colloids.  
(4) absorbed around the surface of the soil colloids.  
(5) fixed with organic colloidal particles.
49. A student took a 60 g soil sample and made it wet and tried to form a ring. From this experiment, he tried to determine the,  
(1) soil structure.      (2) soil texture.      (3) soil colour .  
(4) soil density.      (5) soil resistancy .
50. The land is classified as shown in the diagram. The most suitable crop types to grow in zone 1 and zone 2 are,  
(1) paddy and flora.  
(2) flora and field crops.  
(3) paddy and pasture grass.  
(4) pasture grass and paddy .  
(5) vegetable crops and grass.



## 4. Plant Nutrition

- The most suitable nitrogen contained fertilizer to be applied to a soil in a frequently flooding area is  
(1) Ammonium Sulphate                      (2) Calcium Nitrate                      (3) Urea  
(4) Dolomite                                      (5) Gypsum
- In compost fertilizer production a certain amount of already prepared compost is mixed with the new mixture. The expectation of this act is to,  
(1) control agents of diseases in the mixture.  
(2) improve nutritional composition of compost fertilizer .  
(3) reduce activity of anaerobic microbes.  
(4) reduce compost fertilizer production time.  
(5) improve C:N ratio of compost fertilizer .
- The fertilizer that is produced as the result of carbon dioxide reacting with dehydrated Ammonia is,  
(1) Ammonium Sulphate.                      (2) Triple super phosphate.  
(3) Muriate of potash.                      (4) Sodium Nitrate.                      (5) Urea.
- The following characteristics can be noticed in the plants as a result of nutrient deficiencies  
● Yellowing of tender leaves  
● Veins can be observed as a dark green net ( Chlorosis in between veins)  
  
According to the above characteristics, the deficient nutrient of the plant is,  
(1) nitrogen.                                      (2) phosphorous.                      (3) potassium.  
(4) chlorine.                                      (5) iron.
- A few statements on mixed fertilizer are given below  
A - Plants receives all nutrients at appropriate dosage by applying mixed fertilizer to the crop  
B - Price of the mixed fertilizer is relatively higher than straight fertilizer  
C - A balanced fertilizer mixture contains three main nutrients  
  
From the above statements  
The correct statement/s is/are,  
(1) A only.                                      (2) B only.                                      (3) A and B only.  
(4) A and C only.                                      (5) B and C only.
- A farmer observed that the mature leaves of a pineapple cultivation gradually become purple in colour and this condition spreads even to tender leaves. He decided that this condition happened as a result of a nutrient deficiency. That nutrient deficiency is,  
(1) calcium.                                      (2) nitrogen.                                      (3) magnesium.  
(4) phosphorous.                                      (5) potassium.

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7. The type of organic fertilizer that contains the highest nitrogen percentage is,  
(1) farm manure. (2) goat manure. (3) cow dung.  
(4) pig manure. (5) poultry manure.
8. The required amount of Urea to prepare 1000kg of grade 5-5-15 mixed fertilizer is,  
(1) 110kg. (2) 210 kg. (3) 230 kg. (4) 420 kg. (5) 460 kg.
9. The following are statements related to the factors affecting on soil nutrient absorption by plants.  
A - Soil pH value between 6.5-7.5 is favourable to nutrient absorption.  
B - Solubility of Fe and Al increases when pH value is less and phosphate becomes insoluble.  
C - The metal ions in soil such as  $Pb^{2+}$  and  $Cd^{2+}$  are absorbed by collides therefore plants absorbed them easily.  
D - Nutrient absorption occurs well when the pH value of soil water is in the range of 0 - 4.2.

The correct statements from above statements are,

- (1) A and B only. (2) B and D only. (3) A, B and C only.  
(4) A, C and D only. (5) B, C, and D only.
10. The correct statement relevant to nutrient absorption by plants is,  
(1) Calcium is absorbed as  $Ca^{+}$  (2) Magnesium is absorbed as  $Mg^{+}$   
(3) Nitrogen is absorbed as  $N_2$  (4) Potassium is absorbed as  $K^{+}$   
(5) Sulphur is absorbed as  $S^{-}$
11. Nitrogen in a 50kg Urea sample is,  
(1) 12 kg. (2) 23 kg. (3) 46 kg. (4) 30 kg. (5) 100 kg.
12. The element that shows the highest motility is,  
(1) Calcium. (2) Potassium. (3) Magnesium.  
(4) Sulphur. (5) Nitrogen.
13. The movable element that gets fixed to the soil is,  
(1) Sulphur. (2) Phosphorus. (3) Boron.  
(4) Zinc. (5) Molybdenum.
14. Immature defoliation is an effect of,  
(1) Sulphur deficiency. (2) Zinc deficiency.  
(3) Phosphorus deficiency. (4) Sodium deficiency.  
(5) Nitrogen deficiency.
15. N,  $P_2O_5$ ,  $K_2O$  ratio of a fertilizer mixture is indicated as 4:2:1. It describes,  
(1) percentage of N, P, K in the mixture based on its weight.  
(2) grams of N, P, K in the mixture.  
(3) ratio of N, P, K nutrients in the mixture.  
(4) nutrient amounts that has to be supplied at different growth stages of a crop.  
(5) number of N, P, K kilograms in the mixture.

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16. Nitrogen requirement for crop growth is calculated as 72kg per hectare. If the fertilizer efficiency of Urea is 50% and absorbable nitrogen amount in the soil is 36kg, the amount of nitrogen needs to be supplied,
- (1)  $(72 + 36) \times 50/100$ .      (2)  $(72-36) \times 100/50$ .      (3)  $100/46 \times 72$ .  
(4)  $72 \times 100/50$ .      (5)  $(72-36) \times 100/46$ .
17. Consider the following statements on EM solution
- A - Pre-determined weedicide that kills everything.  
B - Microbial solution used to prepare compost fast.  
C - Solution that is used to remove bad odour in animal farms.  
D - Solution that is prepared using *Eudrilus* earthworms.
- The Correct statements from the above are,
- (1) A and B only.      (2) A and C only.      (3) A and D only.  
(4) B and C only.      (5) C and D only.
18. A statement and a reason on Sulphur, as a plant nutrient is given below.
- Statement - Chlorosis occurs as a result of S deficiency.  
Reason - S is a constituent of chlorophylls, protein and nucleic acids.
- The correct answer on the statement and the reason is,
- (1) the statement and the reason are correct and explains correctly.  
(2) the statement and the reason are correct and does not explain correctly.  
(3) the statement is correct - The reason is incorrect.  
(4) the statement is incorrect - The reason is correct.  
(5) both statement and reason are incorrect.
19. Mutual nitrogen fixation is enhanced by,
- (1) Co.      (2) Mn.      (3) Zn.      (4) Mo.      (5) Ca.
20. Denitrification bacteria is,
- (1) *Acetobactor*.      (2) *Nitrosomonas*.      (3) *Pseudomonas*.  
(4) *Nitrobactor*.      (5) *Rhizobium*.
21. A common deficiency symptom of K, Ca and Mg elements is,
- (1) vascular tissues are grow weakly.  
(2) anthosynine production is enhanced.  
(3) tip of leaves are bend.  
(4) appearance as necrosis leaf .  
(5) root system is weak.
22. Plants absorb minerals in ionic form by,
- (1) difference of the water potential.      (2) selective absorption.  
(3) molecular diffusion.      (4) differences in osmosis pressure.  
(5) passive absorption.

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23. Inorganic nutrients in soil exist in the form of,  
 (1) molecules. (2) atoms.  
 (3) ions. (4) organic compounds.  
 (5) insoluble compounds.
24. When plants are dried, smashed and heated in a crucible the precipitate is formed with,  
 (1) about ten elements of amides and carbonates.  
 (2) about three elements of oxides and carbonates.  
 (3) carbon only.  
 (4) starch and related compounds of it.  
 (5) protein and related compounds of it.
25. Nitrification bacteria,  
 (1) emits nitrogen as gaseous nitrogen.  
 (2) deoxidize Ammonia to Nitrate.  
 (3) free nitrogen converts to nitrogen compounds.  
 (4) protein is converted to nitrogen.  
 (5) protein is converted to Amino acids.
26. The chart given below shows the different microbial activities
- |                |   |   |
|----------------|---|---|
| A Nitrosomonas | - | Nitrite is converted to Nitrate         |
| B Theobacillus | - | Denitrification                         |
| C Nostock      | - | Living freely and fixing nitrogen       |
| D Acetobactor  | - | Fix nitrogen under anaerobic conditions |

The correct relationships are,

- (1) A and B only. (2) A and C only. (3) A and D only.  
 (4) B and C only. (5) C and D only.
27. A few statements of a student on identification of the main characteristics of an essential element are given below.
- A - Essential elements affect only plant reproduction.  
 B - Function of an essential element cannot be performed by any other element.  
 C - Directly affect a plant's metabolic activities.  
 D - Plant absorbs all essential nutrients from the soil.

The correct statements from the above are,

- (1) A and B only. (2) A and C only. (3) A and D only.  
 (4) B and C only. (5) C and D only.
28. A table given below indicates the functions of different essential elements. What is the most appropriate matching answer.

Function	Essential element
(1) Preparing protoplasm	Zn, Mo, Cl
(2) Ionic balance	C, H, O
(3) Preparing the frame	C, H, O
(4) Control the osmosis pressure in cells	Mg, Ca, Zn
(5) Stimulant function	N, B, Cl



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The above pictures A and B show two types of fertilizers. Select two types respectively,

- (1) Murate of Potash and Super phosphate.
- (2) Urea and super Phosphate.
- (3) Ammonium Sulphate and Urea.
- (4) Sulphate of potash and Ammonium Sulphate.
- (5) Murate of Potash and Urea.

37. An incomplete mixed fertilizer is,

- (1) mixed V fertilizer used in paddy cultivation.
- (2) CRI mixed fertilizer used in coconut cultivation.
- (3) 'Bandi' fertilizer mixture used in paddy cultivation.
- (4) RRIC mixed fertilizer used in rubber cultivation.
- (5) vegetable mixed fertilizer .

38. Some information related to a certain element is given below

- Chlorophyll is needed for synthesis
- Included in cytochromes and certain enzymes
- Becomes poisonous at low soil pH values

According to the above characteristics the element is,

- (1) Zn.      (2) Fe.      (3) Mg.      (4) Ca.      (5) K.

39. The plant which is suitable for green manure is,

- (1) Guinea grass and Puraria.
- (2) Napier and Ceteria.
- (3) Gothamala and Azolla.
- (4) Wild sunflower and Sunhemp.
- (5) Kappetia and Ginny grass.

40. A few statements related to the change in composition of farm manure is given below.

- A - Composition varies according to the type of the animal  
B - Composition varies according to the way of animal rearing  
C - Composition varies according to the age of animals

The correct statement/s from above statements is/are,

- (1) A only.      (2) A and B only.      (3) A and C only.  
(4) B and C only.      (5) All A, B and C are correct.

41. The Most suitable temperature range for the plant nutrient absorption is,

- (1) 10-16 °C.      (2) 16- 24 °C.      (3) 25-33 °C.  
(4) 34-43 °C.      (5) 44-50 °C.

42. Types of green manure that has to be added to the soil around the farm and externally added to the soil and buried with soil are respectively,

- (1) Sunhemp, Kappetia.
- (2) Glyricedia, Ipil Ipil.
- (3) Water tramarind, sunhemp.
- (4) Kappetia, Glyricedia.
- (5) Arardu, Ipil ipil.

**(A/L) Agricultural Science - Multiple Choice Questions and Answers**

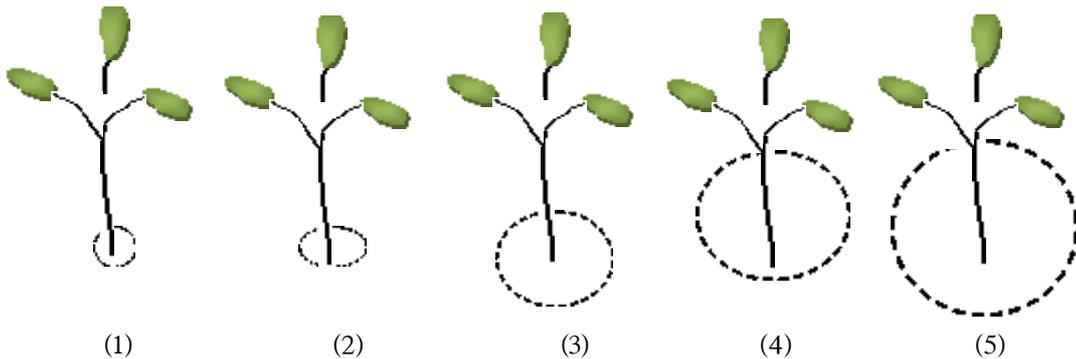
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43. A student wanted to test the most suitable conditions for the preparation of compost. He observed five heaps of compost collected from five regions A, B, C, D and E. Temperature, moisture and pH values of them were as follows;

	A	B	C	D	E
Temperature (°C)	72	63	50	35	20
Humidity (%)	25	60	45	35	25
pH value	9	6.5	8.5	5.5	4.5

Most efficient composting process occurs in ,

- (1) A.                      (2) B.                      (3) C.                      (4) D.                      (5) E.
44. If the nitrogen requirement of a vegetable cultivation is 230kg per hectare, the theoretical quantity of urea needed to fulfill that requirement is,
- (1) 250 kg.              (2) 50 kg.              (3) 70 kg.              (4) 1000 kg.              (5) 1250 kg.
45. From the following pictures, the correct distance from the plant for applying fertilizer is shown in



- (1)                      (2)                      (3)                      (4)                      (5)
46. Agro chemicals are largely used in agricultural areas and they added to the water bodies and pollute the water . Drinking such polluted water leads to Blue baby syndrome. The chemical that may affect the above condition is,
- (1) Urea.                      (2) Dolomite.                      (3) Gypsum.  
(4) Glyphosate.              (5) Carbofuran.
47. The correct statement from the given statements is,
- (1) atmospheric temperature affects the absorption of plant nutrient.  
(2) In trapping the nutrients, inorganic colloids contribute more than the organic colloids.  
(3) at the higher pH values solubility of Aluminum and Iron increases and becomes poisonous to the plants.  
(4) at low pH values, the activity of soil microbes increases and availability of nutrients increase.  
(5) in the weak drainage conditions, the activity of nitrification bacteria increases and nutrients availability increase.

**(A/L) Agricultural Science - Multiple Choice Questions and Answers**

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48. A few statements on plant nutrients are given below
- A - Sodium is needed for the growth of leaves and leaf sheath of grass family
  - B - Plants absorb Carbon as  $\text{HCO}_3$  and  $\text{CO}_2$
  - C - Calcium deficiency symptoms can initially be observed in mature leaves
  - D - the active process of absorption is inhibited when Cyanide is applied

The correct statements from the above are,

- (1) A and C only.
  - (2) A, B and D only.
  - (3) A and D only.
  - (4) B and D only
  - (5) B, C and D only.
49. Select the group of three straight fertilizers which can be used to prepare a mixed fertilizer for a vegetable crop.
- (1) Urea, Ammonium Sulphate and Muriate of Potash.
  - (2) Urea, Triple super phosphate and Muriate of Potash.
  - (3) Ammonium Sulphate, Fertilizer grade phosphate and Sodium Nitrate.
  - (4) Ammonium Sulphate, Muriate of Potash and Dolomite.
  - (5) Urea, Rock phosphate and Ammonium Sulphate.
50. The mixed fertilizer 5-15-15 which is supplied by Department of Agriculture contains percentages of three types of fertilizers. The three types of fertilizer are shown respectively in
- (1) N,  $\text{P}_2\text{O}_5$  and  $\text{K}_2\text{O}$ .
  - (2)  $\text{P}_2\text{O}_5$ ,  $\text{K}_2\text{O}$  and N.
  - (3)  $\text{K}_2\text{O}$ ,  $\text{P}_2\text{O}_5$  and N.
  - (4)  $\text{K}_2\text{O}$ , N and  $\text{P}_2\text{O}_5$ .
  - (5) N,  $\text{K}_2\text{O}$  and  $\text{P}_2\text{O}_5$ .

***(A/L) Agricultural Science - Multiple Choice Questions and Answers***

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1. Some statements on the condition that could be expected in the field due to ploughing to the same depth continuously for several seasons.

- A - Compaction of soil
- B - Drainage become irregular .
- C - Mechanization of the farm.
- D - Soil bulk density becomes stable.

The correct statements from the above are,

- (1) A and B only .
- (2) A and C only .
- (3) A and D only .
- (4) B and C only .
- (5) C and D only .

2. Land preparation increases,

- (1) soil porosity and particle density .
- (2) microbial activity and soil porosity .
- (3) soil texture and bulk density .
- (4) soil color and bulk density .
- (5) soil cation exchange capacity and pH.

3. Due to the increase in soil random roughness,

- (1) orderly patterns are created on the soil surface.
- (2) the total number of temporary depressions on the soil increase.
- (3) the water holding capacity of the soil is reduced.
- (4) the soil water conductivity decrease.
- (5) the surface runoff increase.

4. From the following statements, select the correct answer that gives the proper order of primary land preparation steps.

- (1) turning the soil, harrowing, bed preparation and leveling.
- (2) harrowing, bed preparation, leveling and soil fumigation.
- (3) turning the soil, bed preparation, leveling and making drains.
- (4) harrowing, bed preparation, soil fumigation and making drains.
- (5) turning the soil, harrowing, leveling and bed preparation.

5. The depth of ploughing in deep ploughing is,

- (1) 5 - 10 cm.
- (2) 10 - 15 cm.
- (3) 15 - 20 cm.
- (4) 20 - 25 cm.
- (5) 25 - 30 cm.

6. Few statements on loosening of sub soil are given below.

- A - This may prevent lateral development of tap roots of the crop.
- B - Surface hard strata are broken by this.
- C - This is practiced when cultivating crops with fibrous root systems.
- D - Used for lands which are ploughing continuously at a uniform depth.

The correct statements from the above are,

- (1) A and B only .
- (2) A and C only .
- (3) A and D only .
- (4) B and C only .
- (5) C and D only .

***(A/L) Agricultural Science - Multiple Choice Questions and Answers***

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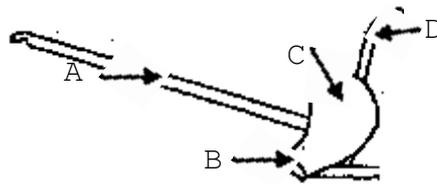
7. The group of crops which can be cultivated in a field without preparing beds is,
- (1) tomatoes, chillies, brinjals and okra.
  - (2) maize, innala, manioc and hingurala.
  - (3) green leaves, paddy, sugarcane and chillies.
  - (4) mung beans, cowpea, soya beans and black grams.
  - (5) bitter gourd, luffa, snake gourd and capsicum.
8. In the conventional soil tillage,
- (1) only primary land preparation is done.
  - (2) only secondary land preparation is done.
  - (3) both primary and secondary land preparations are done.
  - (4) primary, secondary and inter-cultivation are done.
  - (5) secondary and inter-cultivation are done.
9. Inter-cultivation is an activity done to the soil,
- (1) after land preparation and before sowing seeds.
  - (2) after sowing seeds before germination.
  - (3) before flowering.
  - (4) after flowering.
  - (5) until harvesting is taken.
10. When comparing conventional tillage, the minimum soil tillage,
- (1) provides a higher seed germination percentage.
  - (2) increase the decomposition rate of the organic matter .
  - (3) reduces the development of root nodules in legume crops.
  - (4) reduces the immergence of perennial weeds.
  - (5) has a higher labour land preparation cost.
11. Some statements on zero tillage are given below.
- A – Primary land preparation is not practiced.  
B – Secondary land preparation is only confined to plant rows.  
C – Slow active, non selective herbicides are applied before sowing of seeds.  
D – Quick active, selective herbicides are used after seed germination.
- The correct statements from the above are,
- (1) A and B only.
  - (2) A and C only.
  - (3) A and D only.
  - (4) B and C only.
  - (5) C and D only.
12. An advantage of zero tillage is,
- (1) more suitable for cultivation of crops having small seeds.
  - (2) increases a percentage of soil germination.
  - (3) minimizes the use of inorganic fertilizers.
  - (4) improves soil and water conservation.
  - (5) prevents soil compaction.

**(A/L) Agricultural Science - Multiple Choice Questions and Answers**

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13. Soil structure is disturbed due to,  
(1) minimum tillage (2) zero tillage  
(3) loosening of sub surface soil (4) puddling  
(5) deep ploughing
14. A primary land preparation implement is a,  
(1) tyre tiller. (2) rotovator. (3) weeder.  
(4) disc plough. (5) spike tooth harrow.
15. A multi task land preparation implement is a,  
(1) rotovator. (2) hand fork. (3) hoe.  
(4) mammaty. (5) spike tooth harrow.

- Questions 16 – 19 are based on the figure give below.



16. The land preparation equipment given in the figure is a,  
(1) traditional wooden plough. (2) metal plough. (3) spring tooth harrow.  
(4) leveler. (5) disk harrow.
17. A and B components of the figure respectively are,  
(1) beam and hand. (2) cute board and cutting blade.  
(3) cutting blade and hand. (4) beam and cute board.  
(5) beam and cutting blade.
18. When the equipment is classified according to the occasion of land preparation and operational power, it is  
(1) man power driven equipment used for primary land preparation.  
(2) man power driven equipment used for secondary land preparation.  
(3) animal power driven equipment used for primary land preparation.  
(4) animal power driven equipment used for secondary land preparation.  
(5) animal power driven equipment used for post seed sowing.
19. The ploughing depth of the equipment given in the above is approximately,  
(1) 10 cm. (2) 15 cm. (3) 20 cm. (4) 25 cm. (5) 30 cm.
20. A plough which can plough a greater extent of land in a day is,  
(1) disc plough.  
(2) mould board plough attached to a four wheel tractor.  
(3) mould board plough attached to a two wheel tractor.  
(4) light metal plough.  
(5) traditional wooden plough.

***(A/L) Agricultural Science - Multiple Choice Questions and Answers***

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21. The function of the furrow wheel of the disk plough is,
- (1) cutting the soil clod.
  - (2) rotating the cutting blade.
  - (3) fixing cutting blades to the stem of the plough.
  - (4) guiding the forward movement of the plough.
  - (5) minimizing the shocks felt by the plough.
22. A hoe is used to,
- (1) control weeds in paddy cultivations.
  - (2) scrape out weeds in field crop cultivations.
  - (3) mix fertilizer with soil in paddy cultivations.
  - (4) loosen the soil during primary land preparation.
  - (5) turn over the soil in secondary land preparation.
23. The following statements describe the factors and why depth should be changed in establishing seeds.
- A - When the size of a seed is bigger, the planting depth of a seed should be lower.
- B - When the amount of stored food in a seed is higher, the planting depth of seeds should be lower.
- C - a seed should be planted in the depth as roughly equals as three times the diameter of a seed.
- D - Planting depth of a seed may vary with the length of a radicle and soil moisture content.
- The correct statements from the above are,
- (1) A and B only.
  - (2) A and C only.
  - (3) A and D only.
  - (4) B and C only.
  - (5) C and D only.
24. The group of crops which established through sowing of seed is,
- (1) paddy, foxtail millet, sesami, finger millet and mustard.
  - (2) mung beans, beans, cowpea, luffa and snake gourd.
  - (3) string beans, mung beans, brinjal, okra and bitter gourd.
  - (4) chillie, sesami, tomato, brinjal and chick pea.
  - (5) paddy, foxtail millet, black gram, maize and string beans.
25. The crops which are cultivated in triangle method and square planting methods respectively are,
- (1) rubber and guava.
  - (2) rambutan and coconut.
  - (3) paddy and rubber.
  - (4) tea and guava.
  - (5) pineapple and coffee.
26. The nursery which used to obtain paddy seedlings for a paddy trans-planter is,
- (1) noridoko nursery.
  - (2) dapog nursery.
  - (3) pot nursery.
  - (4) raised bed nurseries.
  - (5) sunken bed nurseries.
27. The recommended width and height of a raised bed nursery are respectively,
- (1) 120 cm and 15 cm.
  - (2) 90 cm and 30 cm.
  - (3) 90 cm and 15 cm.
  - (4) 120 cm and 20 cm.
  - (5) 60 cm and 20 cm.

***(A/L) Agricultural Science - Multiple Choice Questions and Answers***

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28. The suitable crop which can be grown in the sunken beds in the wet zone of Sri Lanka is,  
(1) brinjals. (2) kohila. (3) capsicum.  
(4) mustard. (5) string beans.

29. Some activities done in seeding in a seed bed nursery are given below.

- A - Compressing and leveling of the nursery mixture.
- B - giving seed treatment
- C - Sterilization of the nursery
- D - Seeding in rows or sowing
- E - Applying a thin layer of straw

The correct order of the implementation of these activities are,

- (1) A → B → C → D → E. (2) C → B → A → D → E.  
(3) B → A → C → D → E. (4) C → B → A → D → E.  
(5) A → B → D → E → C.

30. The recommended row spacing between rows in seeding in a nursery is,  
(1) 8 - 10 cm. (2) 15 - 20 cm. (3) 25 - 30 cm.  
(4) 35 - 45 cm. (5) 50 - 55 cm.

31. The equipment used for intercultivation is,  
(1) tyre tiller. (2) rotovator. (3) disk harrow.  
(5) disk plough. (5) rotary weeder.

32. The figure shows a,  
(1) primary land preparation equipment.  
(2) secondary land preparation equipment.  
(3) intercultivation equipment.  
(4) seeder.  
(5) trans planter.



33. The secondary land preparation equipment which can be coupled with a four wheel tractor is

- (1) disc plough (2) rotovator (3) tyre tiller  
(4) Japanese mould board plough (5) mould board plough

34. The group of implements used for secondary land preparation is,

- (1) mamoty, hand fork, tyre tiller, disk plough.
- (2) mamoty, disc harrow, mould board plough, craw bar.
- (3) mamoty, disc harrow, tyre tiller, spike tooth harrow.
- (4) rotovator, reversible mould board plough, metal plough, wooden harrow.
- (5) rotary weeder, disc plough, tyre tiller, spike tooth harrow.

***(A/L) Agricultural Science - Multiple Choice Questions and Answers***

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35. Some statements on nurseries are given below.
- A – Mango, guava, avocado and rubber seeds are germinated in a sand nursery.
  - B – Plants for hydroponics are produced in a sponge nursery.
  - C – Compacted nurseries are suitable to grow luffa, snake gourd and pumpkin.
  - D – Damaging to roots could be minimized by planting seedlings obtained from a noridoko nursery.

The correct statements from the above are,

- (1) A and B only.                      (2) A, B and C only.                      (3) A, B and D only.  
(4) A, C and D only.                      (5) B, C and D only.

36. Two characteristics of the land preparation method are given below.

- Soil structure is destroyed.
- Sand, silt and clay settle as individual particles on a hard pan.

The above mentioned land preparation method is,

- (1) conventional tillage.                      (2) minimum tillage.  
(3) zero tillage.                      (4) puddling.  
(5) deep ploughing.

37. A sand bed nursery is mostly used to,

- (1) obtain rootstock plants for the production of budded plants.
- (2) obtain scions for the production of budded plants.
- (3) induce rooting of stem cuttings.
- (4) induce germination of seeds like chillies and okra.
- (5) obtain plants by ground layering.

38. The life span of a crop is twelve weeks. The period for the crop which has to be left in the nursery is,

- (1) one week.   (2) two weeks.   (3) three weeks.   (4) four weeks   (5) five weeks.

- The following equipments are used in the preparation of land. Answer the question 39 and 40 based on these.

- |                  |               |
|------------------|---------------|
| A Rake           | B Disc plough |
| C Leveling board | D Tyretiller  |
| E Mamoty         |               |

39. The primary land preparation equipment operated by mechanical power is,

- (1) A.                      (2) B.                      (3) C.                      (4) D.                      (5) E.

40. The secondary land preparation equipment operated by animal power is,

- (1) A.                      (2) B.                      (3) C.                      (4) D.                      (5) E.

41. A ridger, a primary land preparation equipment is used to,

- (1) prepare ridges and furrows.                      (2) to remove weeds.
- (3) break large soil colloids.                      (4) prepare the land smoothly.
- (5) level the soil.

***(A/L) Agricultural Science - Multiple Choice Questions and Answers***

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42. The most suitable equipment for the primary land preparation implement for an upland is,  
(1) Japanese hoe.                      (2) tyre tiller.                      (3) mould board plough.  
(4) sub soiler.                      (5) disc harrow.
43. The most suitable land preparation equipment that could be used to plough a land with lots of fibrous rooted weeds is,  
(1) disc plough.                      (2) leveler.                      (3) ridger.  
(4) spike tooth harrow.                      (5) hoe
44. A few statements on ploughing are given below.  
A - A greater number of ploughing operation are required in a loose soil.  
B - Ploughing decreases the bulk density of soil.  
C - Ploughing improves soil aeration.
- The correct statement/s from the above is/are,  
(1) A only.                      (2) B only.                      (3) C only.  
(4) A and C only.                      (5) B and C only.
45. The soil free nursery which is used only in paddy cultivation is,  
(1) combined nursery.                      (2) mud nursery.                      (3) noridoko nursery.  
(4) dapog nursery.                      (5) sponge nursery.
46. The weight box of the FMRC two row seeder,  
(1) distributes the seeds in the box methodologically.  
(2) covers the seeds deposited in furrows by soil.  
(3) directs the seeder to be dragged correctly straight along the rows.  
(4) applies the force needed to make furrows to a depth.  
(5) conveys the seeds provided from the rollers on to the ground.
47. The crop which is planted with the spacing of factor of five is,  
(1) paddy.                      (2) tea.                      (3) coconut.                      (4) rubber.                      (5) papaya.
48. The most environmental friendly soil sterilization method is,  
(1) burning of nursery.                      (2) application of fungicides to nursery.  
(3) exposing to higher solar radiation                      (4) fumigation of the nursery.  
(5) application of boiling water.
49. The crop cultivated by broadcasting is,  
(1) chillie.                      (2) tomato.                      (3) string beans.                      (4) okra.                      (5) paddy.
50. In minimizing the pressure given to the soil by the tractor used in the land preparation,  
(1) the light tyres should be used.  
(2) the operational speed of the tractor should be increased.  
(3) the tyres with higher diameter should be used.  
(4) the contact area of the tyre on the land should be increased.  
(5) the pressure inside the tyre should be increased.

## 6. Irrigation and Drainage

1. The method of lifting water from a shallow tube well is,  
(1) andiya lirā (counterpoise lift).                      (2) yoththa.  
(3) centrifugal water pump.                              (4) reciprocating water pump.  
(5) axial flow pump.
2. A pump **does not suck** water through the suction line while it is in operation. Select the most suitable reason/s for this failure of the pump.  
A – Development of air gaps inside the suction line.  
B – Leakages of water through the foot valve.  
C – Over heating of the engine used to operate the pump.

The correct statement/s from the above statements is/are,

- (1) A only.                      (2) B only.                      (3) C only.  
(4) A and B only.                      (5) B and C only.
3. A factor that determines the spacing between drainage canals is,  
(1) slope of the land.                      (2) soil permeability.                      (3) soil colour.  
(4) velocity of lateral water flow.                      (5) soil cover.
4. The artificial removal of excess free water from the soil surface as well as from the root zone is termed,  
(1) drainage.                      (2) seepage.                      (3) evaporation.  
(4) transpiration.                      (5) evapo-transpiration.
5. The following mentioned features are a few characteristics of soil.  
A – The ground water table is deeper  
B – The sub soil is compacted  
C – The anaerobic microorganisms are abundant  
D – The soil aeration is poor

From the above characteristics, which that can be seen in the poorly drained soil are,

- (1) C and D only.                      (2) A, B and C only.                      (3) A, B and D only.  
(4) A, C and D only.                      (5) B, C and D only.
6. The following statements are based on the use of water pumps for irrigation purposes below.  
A – The amount of water discharged by each stroke of reciprocating displacement pumps are equal.  
B – The discharge of water by a centrifugal pumps is continuous and uniform.  
C – The ability to pump muddy water by a displacement pump is an advantage.

The correct statement/s above is/are,

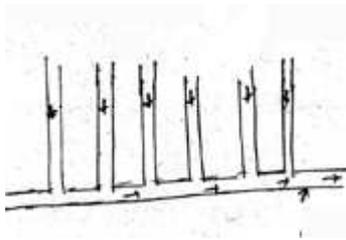
- (1) A only.                      (2) B only.                      (3) A and B only.  
(4) A and C only.                      (5) B and C only.

**(A/L) Agricultural Science - Multiple Choice Questions and Answers**

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7. Flood irrigation is most suitable for,  
(1) paddy cultivation.                      (2) onion cultivation.                      (3) chillie cultivation.  
(4) banana cultivation.                      (5) kurakkan cultivation.
8. The suction head of a centrifugal pump is generally,  
(1) 6 m.              (2) 8 m.              (3) 10 m.              (4) 12 m.              (5) 15 m.
9. It can be observed that water is continuously discharged with pressure from the wells located in some areas of Sri Lanka, because the opening of the well,  
(1) stands on the imaginary pressure line of the ground water table.  
(2) stands above the ground water table.  
(3) stands below the ground water table.  
(4) is located due to a impermeable layer .  
(5) is located close to a watershed.
10. A few statements on the **centrifugal water pumps** are given below.  
A - It is inefficient to pump water to a high elevation.  
B - It requires limited space for installation due to small size.  
C - Water discharge is not uniform.  
D - The impeller is rotated continuously by the water flow.

Which statements are, correct from the above statements

- (1) A and B only.                      (2) A and C only.                      (3) B and C only.  
(4) A, B and D only.                      (5) B, C and D only.
11. The figure shows a,  
1) herringbone drainage system.  
2) random drainage system.  
3) parallel drainage system.  
4) grid iron drainage system.  
5) natural drainage system.
- 
12. Some data related to the calculation of the irrigation water requirement of maize is given below.
- |   |                          |
|---|--------------------------|
| ● Root zone depth                                 | = 10 cm                  |
| ● Bulk density of soil                            | = 1.2 g cm <sup>-3</sup> |
| ● Soil moisture content at the time of irrigation | = 10 %                   |
| ● Field capacity of soil                          | = 20 %                   |
- According to the data given above, the irrigation water requirement of **maize** is  
(1) 1 cm.              (2) 1.2 cm.              (3) 10 cm.              (4) 12 cm.              (5) 120 cm.
13. A source of water in an irrigation system has discharged 4 000 l of water . If the efficiency of shifting is 70 %, the amount of water received by the field is,  
(1) 2 500 l.              (2) 2 800 l.              (3) 3 000 l.              (4) 3 200 l.              (5) 3 500 l.

***(A/L) Agricultural Science - Multiple Choice Questions and Answers***

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14. The following statements are related to 'Ground Water':  
A - Water usually withdrawn from a normal household well is water stored in an artesian aquifer.  
B - In an artesian aquifer, water is stored at high pressure.  
C - The water level of a normal household well is up to the ground water table.  
The most correct statement/s above is/are,  
(1) A only.                      (2) C only.                      (3) A and B only.  
(4) A and C only.              (5) B and C only.
- Some water lifting methods are given below. Answer the question/s 15 and 16 based on these.  
A - Pulley  
B - Yoththa  
C - Displacement pump  
D - Andiyalinda  
E - Water wheel
15. The traditional water lifting method used to lift water from small tanks, reservoirs and canals is  
(1) A.                      (2) B.                      (3) C.                      (4) D.                      (5) E.
16. The equipment which can be used to lift water as a first class lever is,  
(1) A.                      (2) B.                      (3) C.                      (4) D.                      (5) E.
17. Out of the following statements, select the correct statement on the method of irrigation,  
(1) Drip irrigation is suitable to irrigate passion fruit cultivation.  
(2) Ridge and furrow irrigation is suitable to irrigate mango cultivation.  
(3) Pitcher is suitable to irrigate paddy cultivation.  
(4) Basin irrigation is suitable to irrigate chili cultivation.  
(5) Sprinkler irrigation is suitable to irrigate banana cultivation.
18. A few factors related to irrigation are given below.  
A - Root zone depth  
B - Duration of water retention within the root zone depth  
C - Plants consumption of water  
D - Obtainable amount of irrigation water
- From the above factors, the factors that are essential in determining irrigation water requirement and irrigation frequency are,  
(1) A and B only.                      (2) A, B and C only.                      (3) A, B and D only.  
(4) A, C and D only.                      (5) B, C and D only.
19. A few characteristics of poorly drained land are given below.  
A - Accumulation of toxins in the soil.  
B - Ease of using agricultural machinery due to wetness of soil.  
C - Reduction in the rate of decomposition of organic matter.
- The correct statement/s above is/are,  
(1) A only.                      (2) B only.                      (3) C only.  
(4) A and B only.                      (5) A and C only.

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20. It is important to consider climatic, soil and crop factors in determining irrigation water requirement. According to that, the most correct statement out of the statements given below is,
- (1) water requirement of a crop does not vary according to the type and the variety of the crop.
  - (2) water requirement of a crop increases when the duration of the crop is increase.
  - (3) water requirement increases when the density of plants in an unit area is decrease.
  - (4) water requirement decreases when the distribution of the root zone increases.
  - (5) does not have any impact on the duration of the crop.
21. If potential evapo-transpiration rate and Kc value of seedling stage of maize are 9mm and 0.5 respectively, the total amount of evapo-transpiration of the seedling stage of this crop is
- (1) 0.8m m.
  - (2) 4.5m m.
  - (3) 8.5m m.
  - (4) 9.5m m.
  - (5) 10.5m m.
22. Which statement is correct out of the statements on water sources given below,
- (1) water sources retain water throughout the year .
  - (2) most abundant water sources in Sri Lanka are artificial water sources.
  - (3) water sources approximately cover 30 % of the total land extent of Sri Lanka.
  - (4) Villu is an artificial water source, that can be found in Sri Lanka.
  - (5) streams, rivers and tanks are natural water sources in Sri Lanka.
23. Among the rivers given below, a seasonal river is,
- (1) Daduru oya.
  - (2) Kotmale oya.
  - (3) Uma oya.
  - (4) Maha oya.
  - (5) Wasgamuwa oya.
24. The theoretical suction head of a water pump is determined by the,
- (1) diameter of pipes.
  - (2) capacity of the pump.
  - (3) length of the suction line.
  - (4) atmospheric pressure.
  - (5) depth of the water source.
25. Among the water sources given below, an artificial water source is,
- (1) rivers.
  - (2) villus.
  - (3) lakes.
  - (4) marshland.
  - (5) water streams.
26. Parts of a drip irrigation system are given below .
- A - suction line
  - B - laterals
  - C - main line
  - D - water pump
  - E - emitter
  - F - sub main line
- The order in which the above parts should be fixed in order from the water sources to the crop field is,
- (1) A,B,C,F, D,E.
  - (2) A,D,C,B,F,E.
  - (3) A,D,E,C,F,B.
  - (4) D,A,C,F,B,E.
  - (5) D,A,E,B,C,F.

**(A/L) Agricultural Science - Multiple Choice Questions and Answers**

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27. The ratio of the yield produced by a crop by using 1 cm<sup>3</sup> of water in evapotranspiration,
- (1) water conveyance efficiency.
  - (2) water application efficiency.
  - (3) gross water application efficiency.
  - (4) net water application efficiency.
  - (5) water use efficiency.

28. A few statements on artesian wells are given below.
- A – belongs to the group of deep wells.  
B – Water is stored under high pressure.  
C – Always contain clean water.

The correct statement/s above is/are,

- (1) A only.
- (2) B only.
- (3) A and B only.
- (4) A and C only.
- (5) B and C only.

29. The figure shows a,
- (1) traditional method used to lift water.
  - (2) land preparation equipment powered by man power.
  - (3) method used to produce power by wind.
  - (4) biological pest control method.
  - (5) paddy winnowing machine.



30. The traditional method used to lift water shown in the figure is,
- (1) ardiya well.
  - (2) cable pump.
  - (3) yoththa.
  - (4) pulley.
  - (5) water wheel.



31. A few statements on the water wheel, a traditional method used to lift water, are given below.
- A – Water lifting efficiency is low.  
B – It is not an environment friendly technique, since it is operated by using fuel.  
C – It is not sufficient to supply water to the large extents of land.

The correct statement/s above is/are,

- (1) A only.
- (2) B only.
- (3) C only.
- (4) A and B only.
- (5) A and C only.

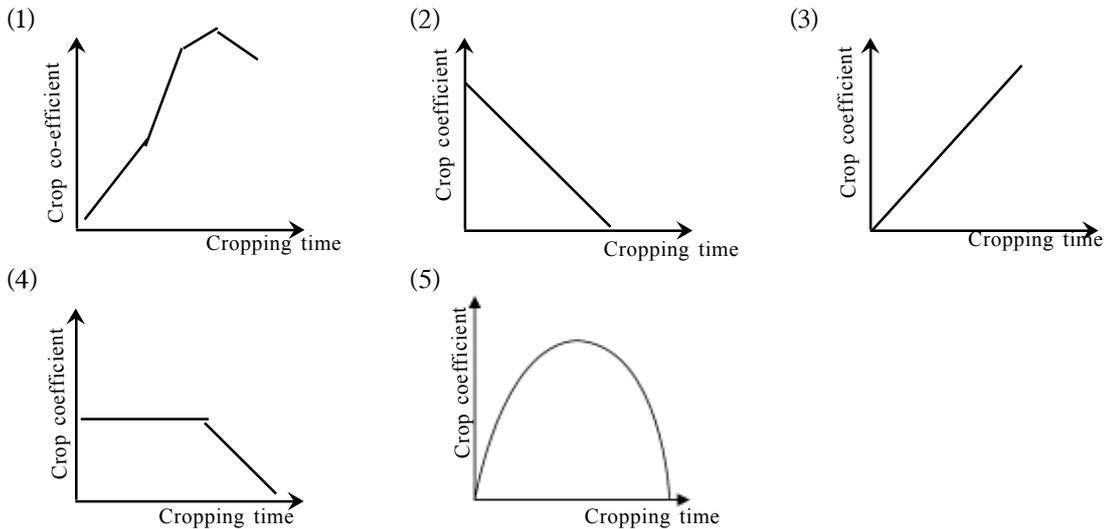
32. If the net water requirement of a crop is 12cm and water application efficiency is 75%, the gross water requirement is,
- (1) 6.25cm.
  - (2) 16cm.
  - (3) 25cm.
  - (4) 63cm.
  - (5) 87cm.

**(A/L) Agricultural Science - Multiple Choice Questions and Answers**

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33. The irrigation method which is not suitable for a field where a strong winds prevail is,  
 (1) sprinkler irrigation. (2) flood irrigation.  
 (3) drip irrigation. (4) basin irrigation.  
 (5) ridge and furrow irrigation.

34. Which graph correctly shows the relationship between age of a plant and its crop factor



35. A crop has the highest maximum water requirement during the,  
 (1) seedling and vegetative stages. (2) vegetative and mature stages.  
 (3) vegetative and reproductive stages. (4) reproductive and mature stages.  
 (5) seedling and reproductive stages.

36. The paddy variety which has the highest water requirement is,  
 (1) Bg 300. (2) At 307. (3) Id 365. (4) Id 408. (5) Bg 452.

37. A few statements on displacement pumps are given below.  
 A – Water is discharged continuously and uniformly.  
 B – Its not suitable to pump waste water and sediment water.  
 C – There is no cost on the fuel.

The correct statement/s above is/are,

- (1) A only. (2) C only. (3) A and B only.  
 (4) A and C only. (5) B and C only.

38. A reason for overheating of an engine coupled with a centrifugal water pump, the,  
 (1) fuel line is blocked with air.  
 (2) lubricant oil level is less than the required level.  
 (3) change of time duration of the ignition for combusting.  
 (4) water leakages from the foot valve.  
 (5) air leakage into the engine.

***(A/L) Agricultural Science - Multiple Choice Questions and Answers***

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39. The correct statement on the surface drainage is,
- (1) when selecting a surface drainage method, it is sufficient only to consider the surface of the land.
  - (2) drainage efficiency can be increased by deep cutting surface canals.
  - (3) drainage canals have to be constructed with low spacing for clay soils and higher spacing for sandy soils.
  - (4) by constructing closed drainage canals randomly in the field surface drainage efficiency can be increased.
  - (5) surface drainage systems are not much practiced with fields of this country.
40. Plants which are suitable to reclaim poorly drained soil are, plants with,
- (1) fibrous root system.
  - (2) high evapo-transpiration rate.
  - (3) tolerate poorly drained soil conditions.
  - (4) produce large number of seeds through sexual propagation.
  - (5) prefer low light intensities with rapid growth.
41. The drainage system which looks like a skeleton of a fish is,
- (1) herringbone
  - (2) grid iron
  - (3) parallel
  - (4) random
  - (5) natural
42. A few statements on sub surface drainage are given below.
- A – Excess water is drained off using a sub surface porous and pipe system.
- B – A system widely used in crop fields in Sri Lanka.
- C – Drainage can be facilitated by installing cylindrical porous bricks below the surface soil.
- The correct statement/s from the above is/are,
- (1) A only.
  - (2) B only.
  - (3) C only.
  - (4) A and C only.
  - (5) B and C only.
43. A soil group which is poorly drained is,
- (1) reddish brown earth
  - (2) red yellow podzolic
  - (3) grumusols
  - (4) regosols
  - (5) humic clay
44. Crops which can be cultivated in poorly drained soil is,
- (1) Kohila, Kang Kung and Mukunuwanna.
  - (2) Kang Kung, Paddy and Gotukola.
  - (3) Spinach, Kan Kung and Sarana.
  - (4) Paddy, Kohila and Kang Kung.
  - (5) Kohila, Sarana and Paddy.
45. An irrigation method which is highly efficient is,
- (1) clay pot.
  - (2) drip.
  - (3) sprinkler.
  - (4) ridge and furrow.
  - (5) basin.

***(A/L) Agricultural Science - Multiple Choice Questions and Answers***

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46. Some of the major factors that should be considered when selecting an irrigation system are,
- (1) topography, soil characters and existing irrigation methods in the area.
  - (2) topography, capital and choice of the farmer .
  - (3) soil characters, climatic conditions and location of the farm.
  - (4) location of the water source, capital and popularity of the irrigation method.
  - (5) extent of the farm, total number of labours and basic equipment required for the irrigation method.
47. If the net water requirement and soil water loss of a field are 16 cm and 4 cm per day respectively, the gross water requirement per day is,
- (1) 4cm.                      (2) 12cm.                      (3) 20cm.                      (4) 32cm.                      (5) 64cm.
48. A few statements on the methods of irrigation are given below,
- A – Drip irrigation is more suitable for perennial crops.  
B – Sprinkler irrigation is suitable for chillies.  
C – Basin irrigation is more suitable for tomatoes.
- The correct statement/s from the above is/are,
- (1) A only.                      (2) B only.                      (3) C only.  
(4) A and C only.                      (5) B and C only.
49. A student has stated the following reasons for poor drainage.
- A – A deep ground water table.  
B – Compaction of sub soil.  
C – Ploughing to same depth.
- The correct statement/s from the above is//are,
- (1) A only.                      (2) B only.                      (3) C only.  
(4) A and B only.                      (5) B and C only.
50. The most suitable irrigation method for the crops cultivated in a poly tunnel is, .
- (1) sub surface irrigation.                      (2) sprinkler irrigation.
  - (3) boarder irrigation.                      (4) ring irrigation.
  - (5) ridge and furrow irrigation.

## 7. Plant Propagation

- Female part (Carpel) of a flower contains,
  - anther, stigma and filament.
  - stamen, filament and stigma.
  - pollen grains, stigma and style.
  - stigma, style and ovary.
  - ovule, ovary and filament.
- Dicotyledonous plants that contain bisexual flowers are,
  - coconut and chili.
  - ridge-guard(luffa) and avocado.
  - thai brinjal (katu) and chili .
  - avocado and coconut.
  - pumpkin and chili.
- The correct statement on microspores is,
  - four microspores are produced from mitosis of pollen mother cell (meiocyte).
  - microspore becomes a pollen grain.
  - meiosis occurs when microspore becomes pollen grain.
  - mother cells of microspores are haploid.
  - meiosis occurs when microspore becomes pollen grains.
- In an experiment carried to find the percentage of moisture, The initial weight of a seed sample was 50 g. Then the sample was dried in an oven till its constant weight was 42g. The percentage of moisture content of the sample is,
  - 4 %
  - 10 %
  - 16%
  - 19%
  - 84%
- The following two statements are on a flower
  - In self-pollination, pollen grains of an anther in a flower, deposit on the stigma of the same flower or on the stigma of a different flower of the same plant.
  - In some flowers even after flowering, stamens and stigma are hidden by the other parts of the flower .

The correct answer from the above two statement is,

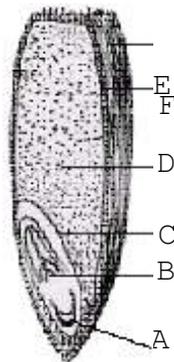
- A is correct and B explains A.
  - A is correct and B is incorrect.
  - A is correct but B does not explain A.
  - B is incorrect and A is correct.
  - Both A and B are incorrect.
6. Select most accurate combination

	Before fertilization	After fertilization
(1)	Male gamete	Embryo
(2)	Secondary nucleus	Endosperm nuclear
(3)	Ovary coat	Fruit coat
(4)	Ovary micropyle	seed coat/testa
(5)	Ovary wall	Fruit coat

***(A/L) Agricultural Science - Multiple Choice Questions and Answers***

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7. The part of the seed which provides nutrients for the embryo during seed germination is,  
(1) seed coat/testa.      (2) ovary wall.      (3) endosperm.  
(4) microphyte.      (5) epicotyl.
8. In dicotyledonous seeds,  
(1) cotyledon is called as scutellum.  
(2) seed coat and fruit coat produce seed bran.  
(3) endosperm contains deposited food.  
(4) two or more cotyledons can be seen.  
(5) food is stored in the large fleshy cotyledons.
9. Parts of a plant embryo are,  
(1) microphyte, hilum and scutellum.  
(2) microphyte, hilum and plumule.  
(3) microphyte, hilum and radical.  
(4) plumule, radical and cotyledons.  
(5) endosperm, cotyledon and plumule.
- Refer the following to answer the questions 10 and 11.



10. In the above figure, A, B, C, D, E and F are,  
(1) radicle, apical meristem, coleoptile, endosperm and aleurone layer .  
(2) coleoptile, radicle, apical meristem, endosperm, aleurone layer .  
(3) radicle, coleoptile, apical meristem, endosperm, aleurone layer .  
(4) coleoptile, apical meristem, radicle, aleurone layer and endosperm.  
(5) radicle, apical meristem, cotyledon, endosperm and aleuron layer .
11. The function of 'D' in the above figure is,  
(1) developing into the root system.  
(2) protecting the embryo.  
(3) providing nutrients for the embryo.  
(4) developing into the apical bud.  
(5) acting as the leaves.

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12. A few steps in the process of seed germination are given below.

- A - Activation of enzymes
- B - Absorption of water
- C - Emergence of the seedling
- D - Starting seedling development
- E - Blasting seed coat

The correct order of the seed germination process is,

- (1) A, B, C, D and E .
- (2) B, E, A, C and D .
- (3) B, E, A, D and C .
- (4) B, A, D, E and C .
- (5) B, E, C, A and D .

13. In hypogeal germination,

- (1) cotyledons come out of the soil.
- (2) endosperm does photosynthesis to produce food required for embryo development.
- (3) hypocotyl grows faster .
- (4) plumule comes out of the soil and endosperm remains in the soil.
- (5) stored food in the cotyledons is digested for energy requirement in seed germination.

14. The statements on the seed viability are given below .

- A - Seeds that are unable to germinate even after providing the required conditions for seed germination such as moisture, temperature, Oxygen, etc. are dormant or not viable.
- B - Seeds which are unable to germinate due to some reason are dormant seeds.
- C - all un germinated seeds are non-viable.

The correct statement/s is/are

- (1) A only .
- (2) B only .
- (3) A and B only .
- (4) A and C only .
- (5) B and C only .

15. The two statements on seed viability are given below .

- A - High temperature reduces seed viability
- B - Enzymes in the seeds with high moisture content, activate at high temperatures, accelerating the metabolic activities of the seeds, producing a lot of heat.

Out of these two statements,

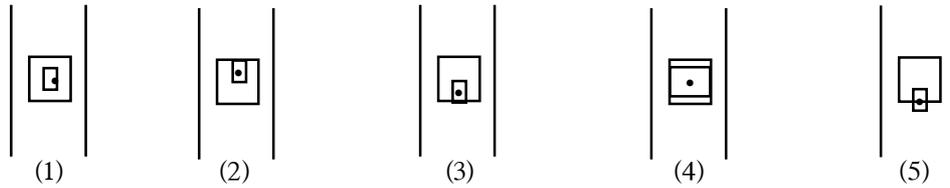
- (1) only A is correct and B is incorrect.
- (2) B is correct and A explains B.
- (3) Only B is correct.
- (4) A and B are correct and B explains A.
- (5) A and B are correct but B does not explain A.



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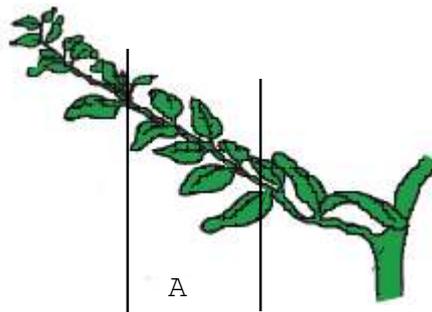
23. Select the correct diagram which describes the placing a scion on the root stock in a patch budding.



24. An adaption to self pollination in plants is,

- (1) protandrous.                      (2) protogynous.                      (3) cleistogamy.  
 (4) heterostyly.                      (5) dioecious.

25. according to the given diagram, part A is used to successfull rooting.



- (1) manioc, bougainvillea and gliricidia.  
 (2) carnation, sweet potato, and rose.  
 (3) rose, erythrina, pepper.  
 (4) sweet potato, bougainvillea and betel.  
 (5) mussandra, olender (kanu), gliricidia.

26. The most suitable method to obtain virus free plants is

- (1) tissue culture.                      (2) micropropagation.                      (3) budding.  
 (4) layering.                      (5) sexual propagation.

27. A few statements on budding are given below.

- A - A single-bud-bearing scion is selected for budding  
 B - All time superior plants to mother plants can be obtained through budding  
 C - For a successful budding, cambiums of root stock and scion must be attached very well.  
 D - In patch budding, the size of the scion equals the size of the peel removed from the root stock.

The correct statements among the above are,

- (1) A and B only.                      (2) A and C only.  
 (3) A, B and B only.                      (4) A, C and D only.  
 (5) B, C and D only.

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28. The correct statement on the seed dormancy is,
- (1) the reason for seed dormancy in passion fruit is the transparent seed coat.
  - (2) seed dormancy in seeds of bitter guard can be removed from splitting the seed coat.
  - (3) seed dormancy in papaw seeds can be removed by dipping in hot water .
  - (4) seed dormancy in lettuce seeds can be removed by exposing to high temperature.
  - (5) seed dormancy in the corn seeds can be removed by providing red light.
29. The most suitable method for storage of cereals is,
- (1) low relative humidity and high Oxygen concentration.
  - (2) high relative humidity and low temperature.
  - (3) low relative humidity and low temperature.
  - (4) high Oxygen concentration and high temperature.
  - (5) low Oxygen concentration and high relative humidity .

30.



The above figure describes a plant propagation method. The crops which can be propagated through this technique are,

- (1) pomegranate, croton and Jasmine
  - (2) pepper , shoe flower and pomegranate
  - (3) jasmine, passion fruit and shoe flower
  - (4) jasmine, lemon and pepper
  - (5) pomegranate, grape and passion fruit
31. Making a cut up to the cambium in a branch of a plant when touching wet soil with the cutting surface it makes the branch to be able to absorb water like root does. This propagation technique is,
- (1) budding.
  - (2) layering.
  - (3) tissue culture.
  - (4) micro propagation.
  - (5) grafting.
32. Plants of perennial crops like pomegranate and rambutan are cut at 5-8 cm above the ground level and are added soil, when the new buds develop, roots are at the base. Later rooted buds can be separated as daughter plants. This propagation technique is,
- (1) plant cloning.
  - (2) tip layering.
  - (3) tissue culture.
  - (4) mound layering.
  - (5) compound layering.
33. The root-stock-plant of the budding must have,
- (1) a broad canopy .
  - (2) a high quality yield.
  - (3) produced fruits in the previous season.
  - (4) a deep penetrated and well distributed root system.
  - (5) a continuous growth habit.



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41. Out of the following sentences, which one is the correct statement on seed germination,
- (1) soya bean is dicotyledonous and epigeal in germination.
  - (2) chick pea (gram) is endospermic and epigeal in germination.
  - (3) castor seed is endospermic and hypogeal in germination.
  - (4) palm seed is dicotyledonous and epigeal in germination.
  - (5) areca nut seed is dicotyledonous and hypogeal in germination.
42. If the hormone concentration ratio of Auxin : Cytokinin is greater than 1 in a tissue culture medium, the expectation of it is,
- (1) inducing shoot development.
  - (2) inducing root development.
  - (3) inducing callus induction.
  - (4) inducing shoots and root development.
  - (5) inducing shoots and callus induction.
43. Among vegetative propagules, the group which contains underground stem are,
- (1) suckers, stolon, rhizome and bulbils.
  - (2) rhizome, corm, bulb and tubers.
  - (3) rhizome, corm, bulbils and suckers.
  - (4) stolon, bulbils, roots and rhizome.
  - (5) suckers, stolon, corm and bulbils.
44. A farmer needed 54 000 maize seedlings to cultivate 2 plant per hole in one hectare of land. If the germination rate of maize is 90 % , the amount of seeds used by the farmer is,
- (1) 12 000.
  - (2) 30 000.
  - (3) 48 600.
  - (4) 54 000.
  - (5) 60 000.
45. The group of seeds with a greater elongation in hypocotyl than in epicotyl elongation is,
- (1) coconut, arecanut, chick pea and rice.
  - (2) yard long bean, mung bean, corn and rice.
  - (3) wing bean, chili, mung bean and bitter guard.
  - (4) coconut, corn, yard long bean and bean.
  - (5) finger millet, snake guard, rice, and brinjal.
46. A student observed that the labels of two seed sacks were light-green and light-blue. The seed classes of these two sacks are consecutively,
- (1) breeder seeds and foundation seeds.
  - (2) foundation seeds and registered seeds.
  - (3) registered seeds and certified seeds.
  - (4) breeder seeds and certified seeds.
  - (5) registered seeds and foundation seeds.
47. The followings are a few statements on seed germination.
- A - In epigeal germination, hypocotyl grows faster than that of epicotyl.
  - B - The food produced by the cotyledons is important for nourishment of the seedling in hypogeal germination.
  - C - In epigeal germination, cotyledons come out of the soil.
  - D - Hypogeal germination can be seen mainly in the germination of monocotyledonous plants and some dicotyledonous plants.

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Out of the above statements, the correct statements are,

- (1) A and B only.                      (2) A, B and C only.  
(3) A, B and D only.                (4) A, C and D only.  
(5) B, C and D only.

48. The propagation method described in the following figure is,

- (1) scion budding.  
(2) grafting.  
(3) simple layering.  
(4) compound layering.  
(5) tip layering.



49. A few budding methods are given below.

- A - Stone budding.  
B - Shield budding.  
C - Tongue budding.  
D - Arch budding.

Out of above budding methods, the methods used for the plant rehabilitation are,

- (1) A and B only.                      (2) A and C only.  
(3) B and D only.                      (4) A, B and D only.  
(5) B, C and D only.

50. The best tissue culture method to get haploid plants for plant breeding is,

- (1) embryo culture.  
(2) meristematic tissue culture.  
(3) root culture.  
(4) protoplasmic culture.  
(5) pollen culture.

## 8. Plant breeding

- The individual with the same alleles in the same species is,  
(1) double recessive. (2) homologous. (3) heterozygous.  
(4) homozygous. (5) heterologous.
- The following statements are on plant breeding.  
A - There is a chance for adverse characters to emerge in the progeny of inbreeding.  
B - Pure line selection is suitable for cross pollinated plants.  
C - Self-pollination is implemented for hybridization.  
D - Terminated seeds are called suicide seeds.  
  
The correct statements from the above statements are,  
(1) A and B only. (2) A and C only. (3) A and D only.  
(4) B and D only. (5) C and D only.
- The tree which carries the status of "Extinct" according to IUCN Red Data Book (1999) is,  
(1) Ebony / Kaluwara (*Diospyros ebenum*)  
(2) Coromandel / Kudumberiya (*Diospyros thwaitesii*)  
(3) Pini beraliya (*Shorea disticha*)  
(4) Dorana (*Dipterocarpus glandulosus*).  
(5) Common rattan/ Rattan / Welwel (*Calamus rotang*).
- A chemical used to induce mutations in plant breeding is,  
(1) Calcium hypochlorite. (2) Ethylene oxide.  
(3) Calcium alginate. (4) Ethyl alcohol.  
(5) Hydrogen peroxide.
- The phenotypic ratio of the progeny which is produced by crossing of two heterozygous parents are,  
(1) 1:1 . (2) 2:2 . (3) 3:1 . (4) 3:2 . (5) 1:1:1 .
- The recessive: dominant ratio of F1 progeny which is produced by a pure breeding program of a plant that has purple flowers and one that has white flowers is,  
(1) 1:4 . (2) 1:3 . (3) 1:2 . (4) 2:3 . (5) 3:4 .
- The following statements are on inbreeding depression.  
A - In inbreeding, adverse characteristics appear in the individuals of the progeny .  
B - In inbreeding, the frequency of heterozygosity decreases while the frequency of homozygosity is increases.  
  
The **most accurate** statement on A and B of the statements is,  
(1) A and B are correct. (2) A is correct and B explains A.  
(3) A is correct and B is incorrect. (4) B is correct and A is incorrect.  
(5) A is correct but B does not explain A.

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8. The following statements are on "Selection Breeding"

- A - Influences inbreeding
- B - Increases heterosis
- C - Increases the number of homozygous locus

The correct statement from the above statements is/are,

- (1) A only.
- (2) B only.
- (3) A and B only.
- (4) A and C only.
- (5) B and C only.

9. The specificity of gene transformed-golden rice is,

- (1) disease tolerance
- (2) high vitamin A content
- (3) high protein content
- (4) large seeds
- (5) high germination percentage

10. A cross was made between a tall plant with green pods and a dwarf plant with yellow pods. All the individuals of F<sub>1</sub> progeny were tall with green pods. When a plant of F<sub>1</sub> was crossed with a dwarf plant with yellow pods, the progeny of F<sub>2</sub> was as follows

- Tall, green pod 23
- Tall, yellow pod 27
- Dwarf, green pod 24
- Dwarf, yellow 29

A few comments on the above results are given below.

- A - Alleles were not segregated independently
- B - F<sub>1</sub> plants were heterozygous
- C - The second cross is a test cross
- D - Tall plants with yellow pods in the F<sub>2</sub> generation were homozygous

The correct statements from the above statements are,

- (1) A and B only.
- (2) A and C only.
- (3) A and D only.
- (4) B and C only.
- (5) C and D only.

11. If a dwarf plant with green pods was crossed with a dwarf plant with yellow pods, the ratio of dwarf plants with yellow pods in the progeny would be,

- (1) 8/16.
- (2) 3/16.
- (3) 1/16.
- (4) 4/16.
- (5) 1/1.

12. The adaptation mechanism which has the least effect on variation is,

- (1) incompatibility.
- (2) protogynous.
- (3) protandrous.
- (4) self-sterile.
- (5) cleistogamy

13. The major objective of plant breeding is,

- (1) provision of a large number of plant products for industries.
- (2) changes of phenotype in plant.
- (3) to prevent variation in plant.
- (4) to increase volume of crop.
- (5) to raise diversity of crops.

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14. The following are three objectives of plant improvement.
- A – Increase fat content of maize.
  - B – Development of the rice variety Bg 360 which is resistance to the brown plant hopper.
  - C – Insert disease and pest resistance of *Bacillus thurengiensis* in to plants
- The correct statement from above statements is/are,
- (1) A only.
  - (2) B only.
  - (3) A and B only.
  - (4) A and C only.
  - (5) B and C only.
15. The term co-breeding refers to,
- (1) To gain progeny among two different plants with different genotype.
  - (2) A method used in engineering to modify the no of chromosome or modify the gene structure.
  - (3) a natural mutation.
  - (4) create new variety by exposing to radiation.
  - (5) mating among the closed varieties.
16. Selection breeding,
- (1) utilizes hybridization.
  - (2) increases the number of heterozygous loci gradually.
  - (3) avoids inbreeding.
  - (4) increases the number of homozygous loci gradually.
  - (5) transfers favourable characteristics of parents to progeny.
17. Red flower characteristic (R) of the Pea plant is dominant to white flower characteristic (r) and green characteristic (G) of pod color is dominant to yellow characteristic (g). If the alleles responsible for each characteristics are segregated independently, the ratio of the red flowered, green pod plants in the progeny produced by the cross of RrGg x RrGg is,
- (1) 9/16.
  - (2) 2/4.
  - (3) 1/3.
  - (4) 1/16.
  - (5) 1/9.
18. In hybridization,
- (1) heterosis is increased gradually from the first generation towards the third generation.
  - (2) heterozygosity of the locus related to the considered characteristic is gradually decreased.
  - (3) heterosis can be maintained from generation to generation.
  - (4) through heterosis in the first generation it is gradually decreased in successive generations.
  - (5) all the locus become double recessive or double dominant.
19. An example for a product of plant hybridization is,
- (1) fish berry
  - (2) pachchaiperumal
  - (3) Bg 360.
  - (4) golden rice
  - (5) tissue cultured pine apple
20. The correct statement on mutation would be,
- (1) mutations can't be seen in micro organisms.
  - (2) mutations are not transmitted from generation to generation.
  - (3) all the time expresses adverse characteristics.
  - (4) mutations occur due to the permanent changes in chromosomes.
  - (5) att the time, alpha, beta and gama rays induce favorable mutations.

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21. A few statements on polyploid plants are given below.

- A – Polyploid plants are agriculturally important.
- B – A polyploid has more than 2 sets of chromosomes.
- C – All the time polyploid arise naturally only.

The correct statement/s from the above statements is/are,

- (1) A only.
- (2) B only.
- (3) A and B only.
- (4) A and C only.
- (5) C only.

22. Colchicine is,

- (1) carcinogenic.
- (2) a mutagen.
- (3) a plant nutrient.
- (4) a growth regulator.
- (5) a growth hormone.

23. The two statements on polyploids are given below.

- A – Tetraploids can produce seeds but the number of seeds less.
- B – Triploids can't produce fertile seeds.
- C – Seedless grape is an example for a triploid.

The correct statement/s from the above statements is/are,

- (1) A only.
- (2) B only.
- (3) A and B only.
- (4) A and C only.
- (5) A, B, and C

24. Pini Beraliya has been included in to red data book as an "extinct" plant species. This species,

- (1) can be seen in a population rarely.
- (2) will be lost in a near future.
- (3) will be lost within few years.
- (4) can be seen only in the conserved lands.
- (5) completely died out.

25. The phenotypic ratio of the progeny of a cross between heterozygous parents for the characteristic of plant height would be,

- (1) 1:1.
- (2) 2:1.
- (3) 3:1.
- (4) 9:6.
- (5) 1:0.

26. The red data book of endangered species has been published by,

- (1) WHO.
- (2) IPCC.
- (3) IUCN.
- (4) CGIAR.
- (5) CIAT.

27. A Pea plant continuously produced green pods in generation to generation after self pollination. This would be,

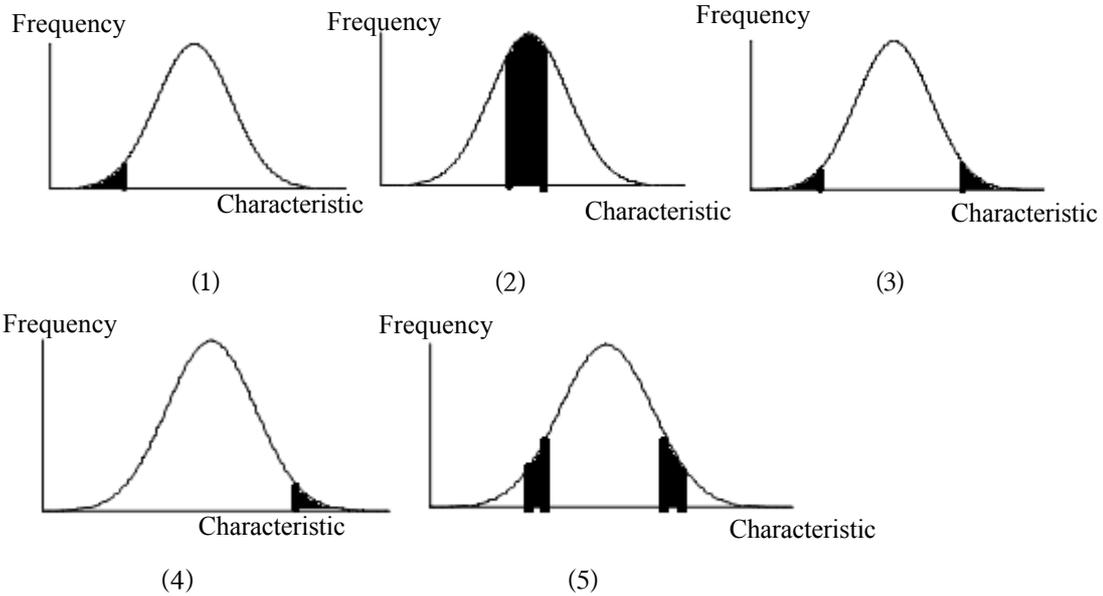
- (1) hybridization
- (2) mass selection
- (3) somaclonal variation
- (4) pure line
- (5) inbreeding

28. The gene that produces its characteristic phenotype only when its allele is identical is called as a recessive gene. When a heterozygous dominant plant is crossed with a homozygous recessive plant, the probability of having a heterozygous offspring would be,

- (1) 0%.
- (2) 75%.
- (3) 50%.
- (4) 25%.
- (5) 100%.

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29. Select the graph which shows variation of a particular character, most suitable as a parent plant for breeding.



30. Two characteristics the Pea plant inherit as follows.

- Tall (T), Dwarf (t)
- Green pod color (G), Yellow pod color (g)

The genotype of the F<sub>1</sub> produced by pure bred tall green pod plant and dwarf yellow pod plant would be,

- (1) TTGG.                      (2) TtGG.                      (3) ttgg.                      (4) Tgtg.                      (5) Ttgg.

31. Joining together of DNA molecules from two different species is,

- (1) micro propagation.                      (2) recombinant DNA technology.  
 (3) bio system technology.                      (4) tissue culture.  
 (5) polymerase chain reaction.

32. A tall round fruited tomato plant was crossed with a dwarf locule-fruited tomato plant. All F<sub>1</sub> plants were tall and round fruited. A plant of F<sub>1</sub> was crossed with a dwarf locule fruited plant and the resultant progeny was as follows.

- Tall round fruited plants                      19
- Tall locule fruited plants                      20
- Dwarf round fruited plants                      18
- Dwarf locule fruited plants                      21

According to above data on cross,

- (1) tall and round fruit are recessive characteristics.  
 (2) F<sub>1</sub> plants are homozygous for both characteristics.  
 (3) tall and round fruit characteristics of F<sub>2</sub> plants are homozygous.  
 (4) the cross between an F<sub>1</sub> plant with a dwarf locule fruited plant is not a test cross.  
 (5) the above characteristics segregate independently.

28. ප්‍රවේණික  
 යම් ලක්ෂණ  
 දැක්වෙන්න

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33. In a plant species, flower color red (R) is dominant to white color (r) and the seed color yellow (G) is dominant to green (g). The ratio of homozygous red flowered and yellow seeded plants of the offspring of RrGg X RrGg dihybrid cross would be,  
(1) 1/16.                      (2) 7/9.                      (3) 0/1.                      (4) 1/1.                      (5) 1/3.
34. The process which exposes seeds to mutagens in order to change the structure of a gene, resulting in a permanent variant form which may be transmitted to subsequent generations and create desirable traits to be utilized for the breeding process is called as,  
(1) pure line selection.                      (2) inbreeding depression.  
(3) hybridization.                      (4) somaclonal variation.  
(5) mutation breeding.
35. A strict nature reserve in Sri Lanka is,  
(1) Horton plane.                      (2) Bellanwila-Aththidiya.                      (3) Kumana..  
(4) Ritigala.                      (5) Haggala.
36. An example for *In-situ* gene conservation would be  
(1) Peradeniya botanical garden                      (2) Minneriya biodiversity park  
(3) Navinna ayurvedic park                      (4) Haggala botanical garden  
(5) Ritigala nature reserve
37. The correct statement on Peradeniya botanical garden regarding its genetic resources conservation method is,  
(1) conservation of organisms in its natural habitats.  
(2) selling natural resources for experimental purposes.  
(3) dissemination of knowledge for local and foreign tourists.  
(4) training floriculturists and distribution of ornamental plants.  
(5) protection of gene pool.
38. The easiest method for ex-situ gene conservation is,  
(1) establishment of forests                      (2) establishment of botanical gardens  
(3) maintaining gene banks                      (4) maintaining medicinal plant gardens  
(5) establishment of seed banks
39. Introducing invasive species to the environment is a cause to disturb the equilibrium of environment. Such invasive species is,  
(1) Pirana.                      (2) Rohu.                      (3) King fisher .  
(4) Mongoose.                      (5) Celonese cylinder snake.
40. Plant genetic resources center in Sri Lanka is located in,  
(1) Homagama.                      (2) Gannoruwa.                      (3) Agalawaththa.  
(4) Mahailuppallama.                      (5) Matale.
41. A tall and a dwarf plant were cross pollinated and all F<sub>1</sub> plants were tall. F<sub>1</sub> plants were self pollinated and the ratio of tall and dwarf plants in F<sub>2</sub> generation would be,  
(1) 1:1.                      (2) 1:0.                      (3) 3:1.                      (4) 1:3.                      (5) 9:6.



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Two statements on the above information are given below.

A – The round seeded Pea plants above behaved as a pure line

B – The round seeded Pea plants above exhibited characteristics of the mother plant in successive generations

The correct explanation of the statements A and B,

- (1) A is incorrect and B is correct.
- (2) A is correct and B explains A.
- (3) B is correct and A confirms it.
- (4) A and B are incorrect.
- (5) A and B are incorrect and the experimental results are also incorrect.

47. The scientists who discovered the genetic hypothesis is,
- (1) Louis Pasteur
  - (2) Leibig
  - (3) Mendel
  - (4) Ratherfed
  - (5) Leven Hook
48. A characteristic of a pure line would be,
- (1) heterologous only.
  - (2) homologous only.
  - (3) heterozygous and independent segregation only.
  - (4) heterozygosity and recombination only.
  - (5) offspring of monohybrid cross
49. A method suitable for the production of new plant varieties is ,
- (1) introduction and mutation breeding.
  - (2) selection and breeding.
  - (3) mutation and selection.
  - (4) selection and introduction.
  - (5) tissue culture technique.
50. Polymerase chain reaction (PCR) is used in genetic engineering. The main objective of PCR is,
- (1) identification of the gene with required characteristics.
  - (2) cutting and removing the gene.
  - (3) insert the separated gene into the vector .
  - (4) multiplication of the isolated gene.
  - (5) protection of the culture media from viruses.

## 9. Crop cultivation on under controlled environment

- The main objective of using net houses as a plant propagator is to,
  - Conserve relative humidity,
  - Control light,
  - Control temperature,
  - Control insect pests,
  - Protect the crop from plant diseases,
- The strategies given below are used in crop cultivation to control the environment conditions,
  - Covering fruits
  - Mulching
  - Solar propagators
  - Hydroponics

The strategies mentioned in the above used for controlling soil environmental condition are,

  - A and B only.
  - A and C only.
  - A and D only.
  - B and C only.
  - A, B and C
- A few plant propagation structures are given below. The questions 3 and 4 are based on them.
  - Green houses
  - Warm beds
  - Polytunnel
  - Lath houses
- Semi-permanent propagation structures are,
  - A and D only.
  - C and D only.
  - A, B and C only.
  - A, C and D only.
  - B, C and D only.
- During the winter season in the temperate countries the required temperature inside plant propagators is provided using the electric heaters. This propagation structure is,
  - B.
  - C.
  - D.
  - E.
  - C and E.
- A permanent propagation structure is
  - green houses.
  - warm beds.
  - cold frames.
  - poly tunnel.
  - water conservation structures.
- Instead of polythene, insect protection nets are used in poly tunnels. The advantage of this is
  - control the entering of insects into the structure.
  - increase the temperature inside the structure.
  - increase the relative humidity inside the structure.
  - prevent the increase in temperature inside the structure.
  - insect protection nets are cheaper.
- A semi-permanent propagation structure, which is created in order to provide shade is,
  - green house.
  - polytunnel.
  - net house.
  - warm beds.
  - cold frames.

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8. Using polytunnels in low country areas is an issue since these areas have,  
(1) high rainfall.  
(2) high insect pest attacks.  
(3) increase in temperature.  
(4) high wind damages.  
(5) scarcity in raw materials in preparing structures.
9. Lath houses are covered with,  
(1) polythene.                      (2) coconut cadjans.                      (3) wooden reepars.  
(4) glass.                      (5) polythene and rope.
10. A suitable place to construct a polytunnel is,  
(1) shady place.                      (2) sunny place.  
(3) area with bushes.                      (4) highest place in a garden.  
(5) a place which gets only morning sunlight.
11. A few statements on cultivating crops under controlled conditions are given below.  
A - A higher yield can be obtained.  
B - Photosynthesis occurs well since the  $C O_2$  concentration around the crop is maintained at a higher level.

From the above statements,

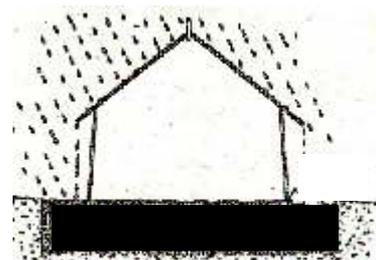
- (1) statement A is correct whereas B is incorrect.  
(2) statement B is correct whereas A is incorrect.  
(3) statement A is correct whereas B explains A.  
(4) statement A is correct whereas B does not explain A.  
(5) Both A and B are incorrect.
12. The following statements are on the importance of cultivating crops under controlled conditions  
A - The quality of the harvest is protected as attacking insect pest is minimized.  
B - A higher yield can be obtained since the crop gets the required conditions  
C - The quality of the harvest is high since the artificial light is provided

According to the above statements, the correct statement/s is/are,

- (1) A only.                      (2) B only.                      (3) C only.  
(4) A and B only.                      (5) B and C.
13. For a successful hydroponic cultivation the pH range of the medium should be within,  
(1) 6.05-7.2.                      (2) 5.5-6.5.                      (3) 6.5-7.2.                      (4) 7.2-8.7.                      (5) 8.7-9.2.

14. The main objective of the plant propagation structure in the diagram is to,

- (1) conserve soil nutrients.  
(2) control temperature and relative humidity.  
(3) conserve soil water.  
(4) control insect pests.  
(5) control light.



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- The following are a few media used in soilless cultivation. Answer question number 15 and 16 based on the information below.  
A- Coir fibre  
B- Coir dust  
C- Sand  
D- Gravel  
E- Vermiculite

15. A suitable planting media for hanging bags is,  
(1) A.                      (2) B.                      (3) C.                      (4) D.                      (5) E.

16. A suitable planting medium for soilless culture adopting pot method is,  
(1) A                                      (2) B                                      (3) a mixture of A and B.  
(4) a mixture of A and C.                                      (5) a mixture of D and C.

- the following diagram shows a soilless culture method. Use this diagram to answer question numbers 17 and 18.



17. The soilless culture method in the diagram above is,  
(1) capillary action culture                      (2) shallow nutrient absorption technique  
(3) root dipping culture                      (4) pot method  
(5) planting tuber crops

18. The medium for the suitable growth medium for the soilless culture method in the above diagram is,  
(1) allen cooper solution.                      (2) B6 medium.  
(3) vermiculite solution.                      (4) coir dust medium.  
(5) MS medium.

19. A few characteristics of a soilless culture are given below.  
A - Root system is made to hang in the empty space.  
B - Root system is made to keep in the dark.  
C - Nutrient solution is provided as a mist for 2 to 3 seconds after 2-3 minutes

This cultivation method is,

- (1) capillary action culture.                      (2) shallow nutrient absorption technique.  
(3) hydroponic culture.                      (4) aeroponic culture.  
(5) floating culture.

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20. In hydroponic cultivation,
- (1) planting medium that provides nutrients for root growth is not limited.
  - (2) it is not essential to provide all plant nutrients externally.
  - (3) a slight decrease of a certain nutrient is not an issue.
  - (4) it is essential to maintain nutrient conservation capacity in the planting medium.
  - (5) it is essential to provide macro nutrients whereas micro nutrients are not essential to be provided.
21. The following statements are related to the pH value of hydroponic culture
- A - Mn, Cu and Fe are absorbed well when it is higher than 7.5  
B - pH value of hydroponic culture should be tested daily  
C - NaOH and HCl is used to correct the pH value
- Correct statement/s from the above statements is/are,
- (1) A only.
  - (2) B only.
  - (3) A and B only.
  - (4) A and C only.
  - (5) B and C only.
22. The accurate statement on electrical conductivity of a hydroponic medium is,
- (1) electrical conductivity indicates the soluble ion concentration of a solution.
  - (2) electrical conductivity indicates the concentration of micro and macro nutrients of a solution.
  - (3) electrical conductivity indicates the positively charged ion concentration.
  - (4) electrical conductivity can be measured by using the pH meter.
  - (5) optimum electrical conductivity of a hydroponic medium is 4dS/m.
23. The most appropriate statement on soilless culture is,
- (1) a large land area is required to establish a soilless culture.
  - (2) cannot be operated in any climatic conditions.
  - (3) adverse effects due to minor defects are minimum.
  - (4) technical and skilled labour not required.
  - (5) labour intensive activities are minimum.
24. A few statements related to the crop cultivation under the controlled conditions are given below.
- A - Only atmospheric factors are controlled when the crops are cultivated under the controlled conditions.  
B - Only the soil factors are controlled when the crops are cultivated under the controlled conditions.  
C - Both soil and atmospheric environment are controlled appropriately to the crop.  
D - Greater attention is paid only to the quality of the harvest.

The correct statements from above are,

- (1) A and B only.
- (2) B and D only.
- (3) B and C only.
- (4) C only.
- (5) D only.

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25. The most accurate statement related to the temporary propagators is,
- (1) environment conditions are controlled from crop establishment to the crop harvest.
  - (2) environment conditions are controlled only at the small plant stage.
  - (3) they are used to protect nursery plants.
  - (4) environment conditions are controlled at the different growth stages of the crop.
  - (5) they are used only to enhance rooting of stem cuttings.

26. Raw materials used to construct the plant propagators are stated below.
- A - Transparent polythene  
B - Colourless plastic sheets  
C - Insect repellent nets

From the above, raw material/s which need to be prepare a simple solar propagator is/ are,

- (1) A only.
  - (2) A and B only.
  - (3) A and C only.
  - (4) C only.
  - (5) C and D only.
27. The cultivation method that used nutrient solution in the soilless culture is,
- (1) hanging bags and pot method.
  - (2) grow bags placed on the floor and nutrient film technique.
  - (3) grow bags place on the floor and root dipping culture.
  - (4) cultivation in Nutrient solution cloud technique and shallow nutrient film technique.
  - (5) nutrient film technique and pot method.
28. In a soilless culture, old coir dust is recommended as,
- (1) the nutrients are added by decomposing it.
  - (2) the water absorption capacity is higher than new coir dust.
  - (3) the cation retention capacity is high.
  - (4) new coir dust has tannins and acids.
  - (5) it has a favourable microbial activity.
29. Examples of organic, natural organic, artificial medium and inorganic natural solid media are respectively,
- (1) coir dust, perlite, granite chips, coir fibre.
  - (2) gravel, rockwool, polyurenine and peat moss.
  - (3) saw dust, perlite, gravel and polyvinyl.
  - (4) organic saw dust, polyurenine, rockwool and gravel.
  - (5) peat moss, polyurenine, polyphenol and gravel.
30. Electrical conductivity of a soilless culture nutrient solution is 50s/m. To correct this condition,
- (1) add dilute  $H_2SO_4$ .
  - (2) add dilute NaOH.
  - (3) add nutrient solution.
  - (4) remove the existing solution and supply new solution.
  - (5) add pure water .

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31. The most convenient method that can be used to control temperature in poly tunnels is,  
(1) using misters inside. (2) using exhaust fans.  
(3) preparing top vents. (4) keeping water buckets inside.  
(5) preparing a few doors.
32. Polytunnels are commonly used in,  
(1) growing cut flowers. (2) chillie cultivation.  
(3) potato cultivation. (4) green leaf cultivation.  
(5) ground nut cultivation.
33. Simple propagators are commonly used in,  
(1) hardening of plants. (2) increasing life span of plants.  
(3) enhancing maturity of plants. (4) rooting of stem cuttings.  
(5) protecting plants from pests.
34. The most accurate statement on polythene houses they,  
(1) are used in water conservation.  
(2) are comparatively cheaper than constructing lath houses.  
(3) are suitable to any environmental condition.  
(4) can be used to grow any fruit crop.  
(5) are considered as a permanent cultivation structure.
35. Enhancing of rooting of stem cuttings in polythene houses is implemented due to high relative humidity and  
(1) Less light intensity. (2) High light intensity.  
(3) High temperature. (4) Free from pests.  
(5) Low temperature.
36. The environment friendly strategy to reduce temperature in a polythene house is,  
(1) reducing plant population in the house.  
(2) placing of water basins in several places.  
(3) using misters.  
(4) opening side walls of the house.  
(5) using fans.
37. The most suitable crop to be cultivated in a fully protected house is,  
(1) anthurium.  
(2) expensive vegetables.  
(3) high yielding yams.  
(4) common green vegetables.  
(5) vegetables that can tolerate hard conditions.
38. The most suitable direction to establish protected house is,  
(1) Northeast – Southwest direction. (2) East south – southwest direction.  
(3) North – South direction. (4) East – west direction.  
(5) direction does not matter .

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39. A student has stated that the benefit of cultivating the crops in the protected houses as follows;

- A - They prevent damages due to high rainfall and high winds
- B - The crops can be cultivated only during the season
- C - Agricultural crop production can be commercialized
- D - Pests and diseases are totally controlled

The correct statements from above are,

- (1) A and B only.
- (2) A and C only.
- (3) B and C only.
- (4) B and C only.
- (5) A and D only.

40. A more suitable crop for floating culture is

- (1) chili
- (2) gotukola
- (3) imala
- (4) anthurium
- (5) tomato

41. A few statements on environment conditions to be considered when constructing protected houses are stated below

- A - When selecting protected house type, should be attentive on agro-ecological zone
- B - Covered houses are more suitable for mid country or up country
- C - Temporary covers such as rainfall covers are suitable for Low country dry zone with high temperature
- D - For the low country wet zone fully covered houses are suitable

According to the above statements, the correct statement/s is/are,

- (1) A only.
- (2) A and B only.
- (3) B and C only.
- (4) A, B and C only.
- (5) B, C and D only.

42. One of the main method to be adopted to ventilate a protected house is,

- (1) opening side walls.
- (2) using lintels.
- (3) keeping the door opened.
- (4) constructing the house so that door is positioned to the wind direction.
- (5) removing wind barriers.

43. Most suitable area to maintain a green house is

- (1) Anuradhapura
- (2) Kandy
- (3) Nuwaraeliya
- (4) Rathnapura
- (5) Kalutara

44. The crops in protected house can be burnt by falling the heated water droplets formed on the lower surface of the roof. Reason for this is, inside the protected house,

- (1) the air circulation is not properly occurred.
- (2) having low light intensity.
- (3) having high humidity.
- (4) having high internal wind speed.
- (5) having high transpiration.

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45. Hydroponic culture means,
- (1) Plant growing method in water
  - (2) Growing planktons on the water surface
  - (3) Plant growing method in disinfected sand medium
  - (4) Aquatic plant growing method
  - (5) Soilless culture method
46. Few statements related to the diagram are given below.
- A - Increase humidity in surrounding environment of the plant
  - B - Minimize water loss due to evaporation and transpiration
  - C - Stimulate rooting by increasing environment temperature and humidity
  - D - Protect the plant from pests



According to the above statements, the most accurate statement/s is/are,

- (1) A and D only.
  - (2) C only.
  - (3) A and B only.
  - (4) A, B and C only.
  - (5) A, B and D only.
47. Few statements on controlling environment conditions are stated below
- A - Fruit covering can be mentioned as a method of controlling the environment conditions
  - B - Banana fruits become larger when it is covered with blue polythene
  - C - Temperature of micro environment and relative humidity are increased by covering with blue polythene while photosynthesis is enhanced by blue colour

According to the above statements,

- (1) A is true whereas B, C and D are false.
- (2) A and B statements are true. C and D are false.
- (3) A is true. C explains A.
- (4) A, B, C are true. A is further explained by B and C.
- (5) A is true. B is explained by A and C.

48.



In reference to the above diagram,

- A - Initial stage of potato cultivation grown according to ridge and furrow method is shown.
- B - Ridge and furrow irrigation method is shown.
- C - Method to enhance seed germination.
- D - Seed plant protection, humidity conservation and temperature increase occurs.

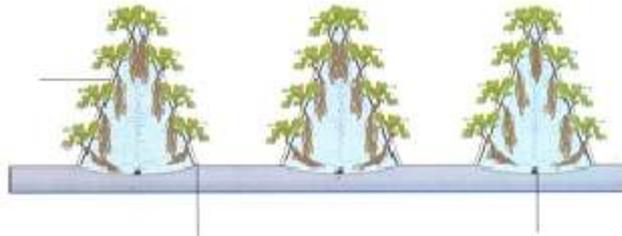
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According to the above statements, the most accurate statement/s is/are,

- (1) A only.                      (2) B and C only.                      (3) A and D only.  
(4) C only.                      (5) C and D only.

49.



The above picture shows,

- (1) temporary plant propagator.                      (2) irrigation method.  
(3) pest control method.                      (4) soil conservation method.  
(5) crop cultivation method.

## 10. Plant physiology

- In plant physiology studies,
  - on synthesis processes that happens in plants.
  - on plant reproduction.
  - about plant cell.
  - on metabolism in cells in live plants.
  - on factors affecting the yield.
- The most appropriate definition for Photosynthesis is,
  - a food production process in the living organisms using carbon dioxide and water .
  - transformation of solar energy in to chemical energy in the live tissues.
  - production of food by living organisms using simple inorganic materials, in the presence of solar energy .
  - an organic food production in the presence of  $\text{CO}_2 + \text{H}_2\text{O}$  using the solar energy in the chlorophyll containing living cells.
  - organic food production with the help of solar energy when Carbondioxide and water are available.



Above reaction represents the,

- Light reaction of photosynthesis.
  - dark reaction of photosynthesis.
  - biochemical process of plant food production.
  - respiration mechanism.
  - Krebs cycle.
- Few statements related to photosynthesis are given below.
    - The light reaction occurs at the places called the reaction centres associated with the Thylakoid membranes in the chloroplasts.
    - The dark reaction occurs in the stroma in the chloroplast.
    - It converts ADP (Adenosine diphosphate) to ATP (Adenosine triphosphate).

From the statements given above, the correct statement/statements are,

- A only.
- B only
- A and B only
- A and C only
- All A, B and C

- A.  $\text{ADP} + \text{PO}_4^{3-} \rightarrow \text{ATP}$   
B.  $\text{NADP} + 2\text{H}^+ \rightarrow \text{NADPH}_2$

According to the A and B reactions given below, the most accurate statement is,

- the photosynthesis process is described by A and B.
- the solar energy is not required for the A and B reactions.
- the A and B reactions occurs in dark.
- a reaction occurs in the light conditions and B reaction occurs in the dark conditions.
- the solar energy should compulsorily be available for the A and B reactions.

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6. Two statements indicating the effect of light on the photosynthesis, are given below.
- A – In the high light intensities, rate of photosynthesis is controlled as a result of destruction of chlorophylls and closure of stoma.
- B – In the high light intensities chlorophylls get destroyed.

Out of the above statements,

- (1) A is incorrect whereas B is correct.
  - (2) B is incorrect whereas A is correct.
  - (3) B is correct whereas A explains B.
  - (4) A is correct whereas B explains A.
  - (5) Both A and B are incorrect.
7. Few statements related to factors affecting Photosynthesis are given below.
- A - There is a linear relationship between the rate of photosynthesis and the light intensity.
- B - The rate of photosynthesis increases when CO<sub>2</sub> concentration increases.
- C - Any factor does not act as a limiting factor for the photosynthesis of inland crops.

The correct statement/s from the above statements is/ are,

- (1) A only.
  - (2) B only.
  - (3) A and B only.
  - (4) A and C only.
  - (5) All A, B and C.
8. Few statements related to the photosynthesis reaction are given below. Out of them, correct statement is,
- (1) when the light reaction occurs the solar energy is deposited in ATP as the chemical energy.
  - (2) ATP and NADPH<sub>2</sub> are the products of light reactions.
  - (3) the light reaction occurs in stroma of chloroplasts.
  - (4) transformation of solar energy into the chemical energy takes place in the stroma of the chloroplasts.
  - (5) ATP, NADPH<sub>2</sub> and O<sub>2</sub> are the products of the light reaction.
9. The statements related to the photosynthesis are given below.
- A – Simple organic compounds are formed at the end of the dark reaction of photosynthesis.
- B – Carbon dioxide is converted to carbohydrates with the help of the products of the light reaction ATP and NADPH<sub>2</sub>.

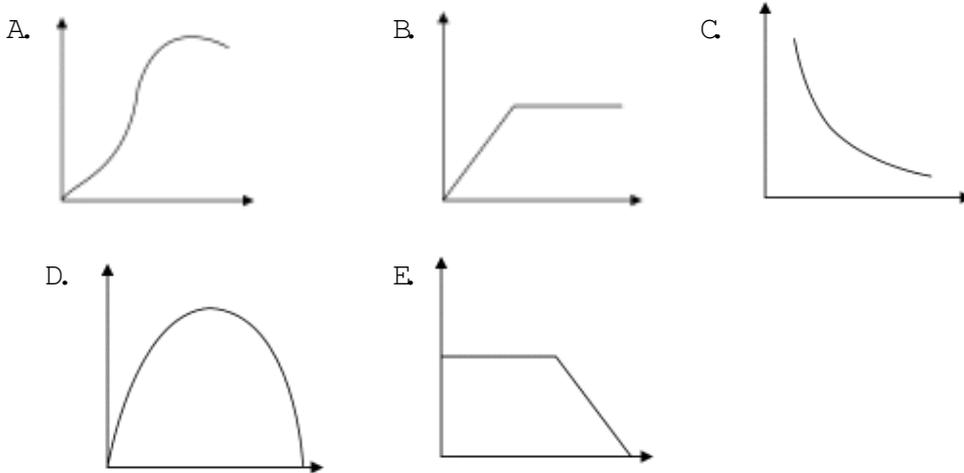
Out of above statements,

- (1) Only A is correct.
  - (2) Only B is correct.
  - (3) A is correct whereas B is incorrect.
  - (4) A is correct whereas B explains A.
  - (5) Both A and B are incorrect.
10. In Glycolysis,
- (1) the molecule of glucose breaks down to two Pyruvate molecules (Pyruvic acid)
  - (2) pyruvic acid is converted to ethanol.
  - (3) glucose is converted to lactic acid.
  - (4) organic compounds are polymerized.
  - (5) pyruvic acid enters to the electron transport system.

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- Answer the question 11 and 12 by using following graphs.



11. The graph that represents the relationship between the rate of the respiration and atmospheric temperature is,

- (1) A.                      (2) B.                      (3) C.                      (4) D.                      (5) E.

12. The graph, representing the relationship between CO<sub>2</sub> concentration and rate of photosynthesis is,

- (1) A.                      (2) B.                      (3) C.                      (4) D.                      (5) E.

13. A few statements on the plant hormones are given below.

- A - Auxins are used to produce seedless fruits by inducing parthenocarpy.
- B - Cytokinin is used to remove the apical dominance
- C - Cytokinin is used to overcome the leaf senescence of green vegetables
- D - Gibberelline is used to induce the seed dormancy

Correct statements from the above are,

- (1) A and B only.                      (2) A and C only.                      (3) A, B and C only.  
 (4) A, C and D only.                      (5) B, C and D only.

14. According to the first stable product in the dark reaction of photosynthesis, plants are divided into two types. They are,

- (1) phototropism and non-phototropism plants.
- (2) C<sub>3</sub> and C<sub>4</sub>
- (3) climacteric and non-climacteric plants.
- (4) monocotyledonous and dicotyledonous.
- (5) haploid or polyploidy.

15. Mango plant in a home garden is delay in onset of fruiting though it has reached its maturity. A reason for this would be the,

- (1) increasing the Carbon content in the plant.
- (2) increasing carbon, nitrogen ratio in the plant.
- (3) decreasing carbon, nitrogen ratio in the plant.
- (4) unfavourable climatic factors.
- (5) affect of a disease.

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16. The important constituent element of ADP and ATP is  
(1) chlorine. (2) potassium. (3) phosphorous.  
(4) calcium. (5) nitrogen.
17. The correct statement on the plant hormones is,  
(1) cytokinin induces defoliation.  
(2) gibberellin controls closing stomata.  
(3) ethylene induces flowering of pineapple.  
(4) auxins induces growth of lateral buds.  
(5) cytokinin avoids plant stunting.
18. Indole Acetic Acid (IAA) which is a plant hormone,  
(1) normally produces in the cell elongation area.  
(2) induces initiation of lateral roots.  
(3) is used in ripening of fruits.  
(4) induces plant cell lignification.  
(5) induces the formation of leaf absciss layer .
19. A constituent element of enzymes is,  
(1) calcium. (2) iron. (3) hydrogen. (4) boron. (5) sulphur .
20. The factor that cause to increases the rate of transpiration is,  
(1) positioning of leaves angle to the earth.  
(2) increase in thickness of cuticle layer .  
(3) hairs on leaf surface.  
(4) sunken stomata in plant leaves.  
(5) Increasing number of cells in Palisade parenchyma.
21. The colour in the visible spectrum which is important to increase the rate of photosynthesis is  
(1) violet . (2) yellow. (3) green. (4) blue. (5) indigo.
22. The first stable product of the dark reaction of photosynthesis in  $C_3$  plants is,  
(1) Glucose -6-Phosphate. (2) Fructose-1-6-diphosphate.  
(3) Glyceraldehyde 3 phosphate. (4) 3 Phosphoglycerate.  
(5) Adenosine di phosphate.
23. A few statements on conjugate plant hormones are given below .  
A - Abundantly available in plant  
B - Really active in metabolism  
C - Controls hormone levels in plants
- The correct statement/s from the above is/are,  
(1) A only. (2) B only. (3) C only .  
(4) A and B only. (5) A and C only .

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24. Crowns of few Jak plants in a home garden have been eaten by a goat and after that plant did not grow vertically. The reason for this may be,
- (1) removal of apical dominance of jak plant.
  - (2) penetration of goat's salivary toxins into the Jak plants.
  - (3) microbe infections through wounds on the stem of the Jak plant.
  - (4) plants become weak as a result of evaporation of water through wounds on the plant stem.
  - (5) disturbance in photosynthesis process due to eating of leaves.

25. A student wanted to measure the transpiration of a plant leaf. The chemical required for this is
- (1) copper chloride.
  - (2) cobalt chloride.
  - (3) silver nitrate.
  - (4) silver chloride.
  - (5) potassium nitrate.

26. The factors that affect the opening of stomata are,
- (1) high light conditions, low pH value and low carbon dioxide concentration.
  - (2) high light conditions, high pH value and low carbon dioxide concentration.
  - (3) high light conditions, high pH value and high carbon dioxide concentration.
  - (4) low light conditions, high pH value and high carbon dioxide concentration.
  - (5) high light conditions, low pH value and high carbon dioxide concentration.

27. Few statements on plant hormones are given below.

- A - Naturally produced in plants
- B - Activate at the place of origin
- C - Organic compound needed in small quantities

The correct statements from the above are,

- (1) A only.
- (2) B only.
- (3) A and B only.
- (4) A and C only.
- (5) B and C only.

28. Below table gives information related to plant hormones in two categories; I and II

Category I	Category II
A Auxins	P. Induce dormancy
B Gibberellin	Q. Ripening of fruits
C Abscisic acid	R. Cell elongation
D Ethylene	S. Seed Germination

The answers that indicates the correct relationship between I and II categories is,

- (1) AP, BQ, CR, DS.
  - (2) AQ, CR, BP, DS.
  - (3) AQ, BR, CS, DR.
  - (4) AS, BR, CQ, DP.
  - (5) CP, DQ, BS, AR.
29. Most acceptable theory on plant water transport is,
- (1) imbibition theory.
  - (2) suction transpiration theory.
  - (3) root pressure theory.
  - (4) capillary theory.
  - (5) atmospheric pressure theory.

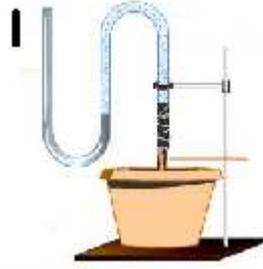
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30. The pathway of water absorbed by root epidermal cells to root xylem tissues is,
- (1) epidermis → cortex → pericycle → endodermis → xylem
  - (2) xylem → pericycle → cortex → endodermis → epidermis
  - (3) epidermis → endodermis → cortex → pericycle → xylem
  - (4) epidermis → cortex → endodermis → pericycle → xylem
  - (5) endodermis → Pericycle → epidermis → cortex → xylem

31. The following apparatus is used to explain,

- (1) ascent of plant sap.
- (2) suction transpiration process.
- (3) the water absorption process.
- (4) root pressure process.
- (5) phloem translocation.



32. A student noticed that a mature mango tree in his home garden is not bearing fruits and as a treatment for that a metal wire was girt around the tree. From the treatment he expects to induce flowering by,

- (1) increasing C/N ratio
- (2) allowing the tree to absorb the metal in the wire.
- (3) damaging the stem to restrict water transportation.
- (4) girdling the tree to strengthen the tree stem
- (5) allowing metal in the wire to react with chemicals in the tree stem.

33. The difference between transpiration and evaporation is, transpiration,

- (1) is a physical phenomenon while evaporation is physiological process.
- (2) is biological process while evaporation is physical phenomenon.
- (3) occurs in living cells and evaporation occurs in dead cells.
- (4) occurs in any cell while evaporation occurs in dead cells.
- (5) is controlled by lenticel and evaporation is controlled by stomata.

34. A few statements on guttation are indicated below.

- A - Occurs in night time.
- B - Water emits in forms of liquid or vapour .
- C - Process with no control.
- D - As a result plant leaf temperature decreases.

The correct statements from the above are,

- (1) A and B only.
- (2) A and C only.
- (3) A and D only.
- (4) A, B and C only.
- (5) A, B and D only.

35. Transpiration means, releasing water,

- (1) from plant leaves in the form of liquid.
- (2) from plant leaves in the form of vapour .
- (3) from aerial parts of plants in the form of liquid.
- (4) from aerial parts of plants in the form of vapour .
- (5) as vapour through a hole in between guard cells.

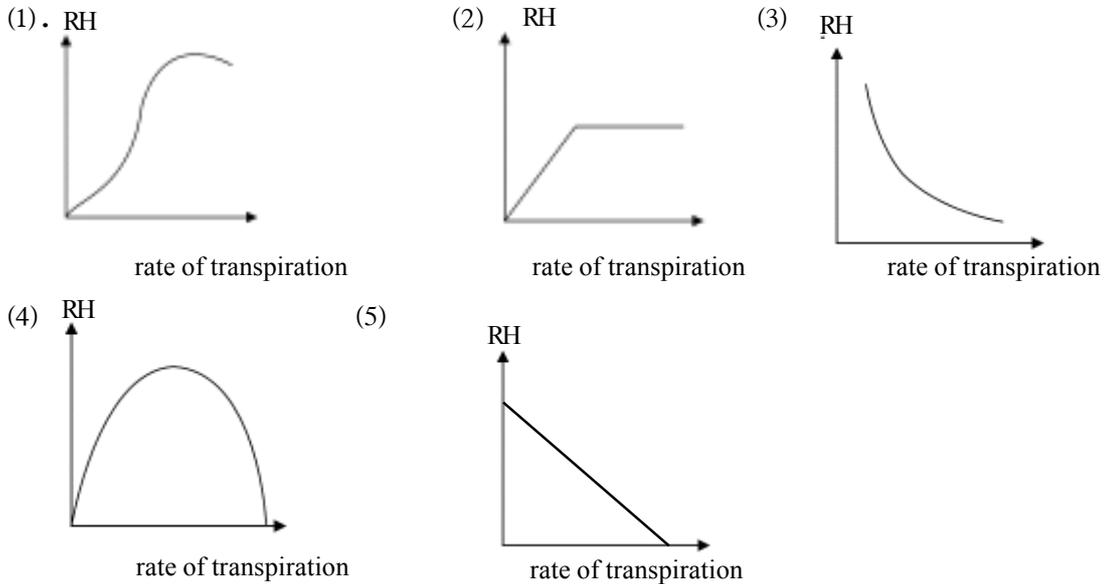
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36. The highest quantity of water is released through,

- (1) lenticels.                      (2) epidermis.                      (3) lenticels and epidermis.  
(4) stomata.                      (5) guttation.

37. Relationship between relative humidity (RH) and the rate of transpiration is represented by



38. Two statements on the plant nutrient absorption are given below.

- A - Materials are absorbed opposite to the concentration gradient using metabolic energy  
B - Materials are absorbed by active absorption when soil water is scarce

Out of the above statements,

- (1) A is correct and B is incorrect.  
(2) A is correct and B does not explain A.  
(3) Both A and B are correct and B explains A.  
(4) A is incorrect and B is correct.  
(5) Both A and B are incorrect.

39. An agricultural practice that controls the rate of transpiration is,

- (1) adding cold water to the soil.  
(2) pruning branches in the shade trees.  
(3) root pruning.  
(4) application of growth hormones.  
(5) removing bark as a ring.

40. The correct statement is,

- (1) ATP is not needed for Glycolysis.  
(2) ATP is needed to complete Krebs cycle.  
(3) ethanol is produced from Pyruvic acid in anaerobic respiration.  
(4) ATP and NADPH<sub>2</sub> are used in light reaction.  
(5) products of light reaction are Ethanol and Carbohydrates.

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41. A few statements on Auxins are given below.

- A - Auxins is mostly synthesized in plant shoot tips, root tips and meristematic tissues.
- B - Auxins never produces in matured leaves and matured roots.
- C - Auxins is translocated from upper parts of shoots to lower parts of roots.
- D - Auxins is mostly translocated through phloem tissues.

The correct statement/s from the above is/are,

- (1) A only.
- (2) C only.
- (3) A, B and C only.
- (4) C and D only.
- (5) A, C and D only.

42. A plastic chip was inserted in to a cut made just below the top of a plant apex. When it was observed after few days, the stem bent towards the cut. The reason for this is,

- (1) growing cells on the side of the cut where the cut is made.
- (2) produced food does not translocate due to the cut.
- (3) materials do not move upwards and downwards due to the cut.
- (4) auxins are not received by the cells just below the cut.
- (5) removal of auxins due to the cut.

43. A few examples for hormones are given below.

- A Induce initiation of root - IAA
- B Applying as a weedicide - 2,4-D
- C Producing fruits without seeds - IBA
- D Removing seed dormancy - GA
- E Ripening fruits -  $C_2H_4$

The correct statements related to auxins are,

- (1) A and B only.
- (2) B and E only.
- (3) A, B and C only.
- (4) A, B and D only.
- (5) C, D and E only.

44. The main substance that transports through phloem tissue is,

- (1) starch
- (2) fructose
- (3) glucose
- (4) sucrose
- (5) maltose

45. Some agricultural activities are given below.

- A - Weed control
- B - Parthenocarpy
- C - Insect pest control

From the above activities, plant growth hormones are used in,

- (1) A only.
- (2) B only
- (3) A and B only
- (4) A and D only
- (5) All A, B and C

46. Following statements are related to plant water absorption.

- A - Water is absorbed by epidermal cells of roots or root hairs.
- B - Transportation of water absorbed by epidermal cells up to xylem tissue is known as Ascent of sap.
- C - Mineral ions absorbed by roots are transported up to xylem tissue through casparian strip

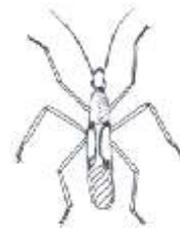


## 11. Pest Management

- Out of following biological pest control activities in the field are,
  - cultivating crops resistant virus.
  - building nests for insectivorous birds.
  - making pheromone traps and other insect control traps.
  - making traps containing foods attractive to insects and other animal pests.
  - preventing entering of pests to the field.
- The reason for more damages from pesticides to the predatory insects than herbivorous insects is,
  - losing their living environment as a result of high dose of pesticides.
  - increasing food consumption because of enhancing their appetite.
  - absorption of more pesticides since they have larger bodies.
  - they get higher dose through food chains.
  - they get high dose through food chain and high doses increase their appetite.
- Non-selective, systematic post emergency weedicide is,
  - Butaclor .
  - Alaklor .
  - Gluphosate.
  - 3,4 DPA.
  - 2,4 - D.
- The insect pest shown in picture is,
  - aphid.
  - saw worm.
  - grasshopper .
  - plant hopper .
  - paddy bug.
- Advantages of a certain pest control method are given below .
  - Shows host specificity
  - No residues in the field
  - Sufficient to establish the control system only once

This pest control method is a,

  - physical method.
  - agronomic method.
  - chemical control method.
  - statutory control method.
  - genetic control method.
- If 125 brown plant hoppers are in 25 paddy plants, it is known as Economic thresh hold level. In this situation,
  - indicates minimum pest population that starts economic injury .
  - cost incur on pest control is higher than the loss of incare due to crop damage
  - pest control should be started.
  - cost incur on pest control is less than the loss of incare due to crop damage.
  - enviroment balance is protected since the 125 mites are in 25 paddy plants.



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7. Few insect pests and their families are given below

Family	Eg :
A - Lepidoptera	P - Illmassa
B - Diptera	Q - Paddy bug
C - Homptera	R -Yellow plant hopper

The correct relationship is given in,

- (1) AQ, BP, CR.                      (2) AR, BP, CQ.                      (3) AQ, AR, AP.  
(4) BP, BQ, BR.                      (5) CP, BQ, AR.

8. Some information on an insect pest is indicated below.

- Shows full metamorphosis
- Larvae stage acts as a pest
- Larvae has chewing and biting mouth parts
- Possess scaling wings

This insect pest would be,

- (1) Illmassa.                              (2) Locust.                              (3) Mealy bug.  
(4) Yellow stem borer .                      (5) Bean fly .

9. A student identified following characteristics of a pest.

- A - Pest lives under the leaves of chillie plants  
B - Leaves of chillie plants rolled downward  
C - No wings

This pest would be,

- (1) Plant hopper .                              (2) White fly.                              (3) Mite.  
(4) Aphid.                                      (5) Epilachna.

10. In pest control, pest population density should be,

- (1) equal to economic threshold level.  
(2) higher than economic threshold level.  
(3) equal to economically damaging level.  
(4) less than economically damaging level.  
(5) at a balance level.

11. A banned pesticide is,

- (1) methyl euginol.                              (2) pyrethrine.                              (3) aflod.  
(4) carbofuran.                              (5) alethrin.

12. Out of the following insects the pest that damaged growth stage of paddy cultivation is,

- (1) Brown plant hopper .                              (2) Gok Messa.  
(3) Leaf folding caterpillar .                              (4) Stem borer .  
(5) Paddy bug.

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13. Three plant diseases are given below .

- A - Coffee rust disease
- B - Tea root knot disease
- C - Potato die back

Causal agents of A, B and C diseases are respectively ,

- (1) Fungus, Bacteria, Nematodes.    (2) Fungus, nematodes, Fungus.
- (3) Bacteria, Nematode, Fungus.    (4) Virus, Nematode, Bacteria.
- (5) Fungus, Nematode, Bacteria.

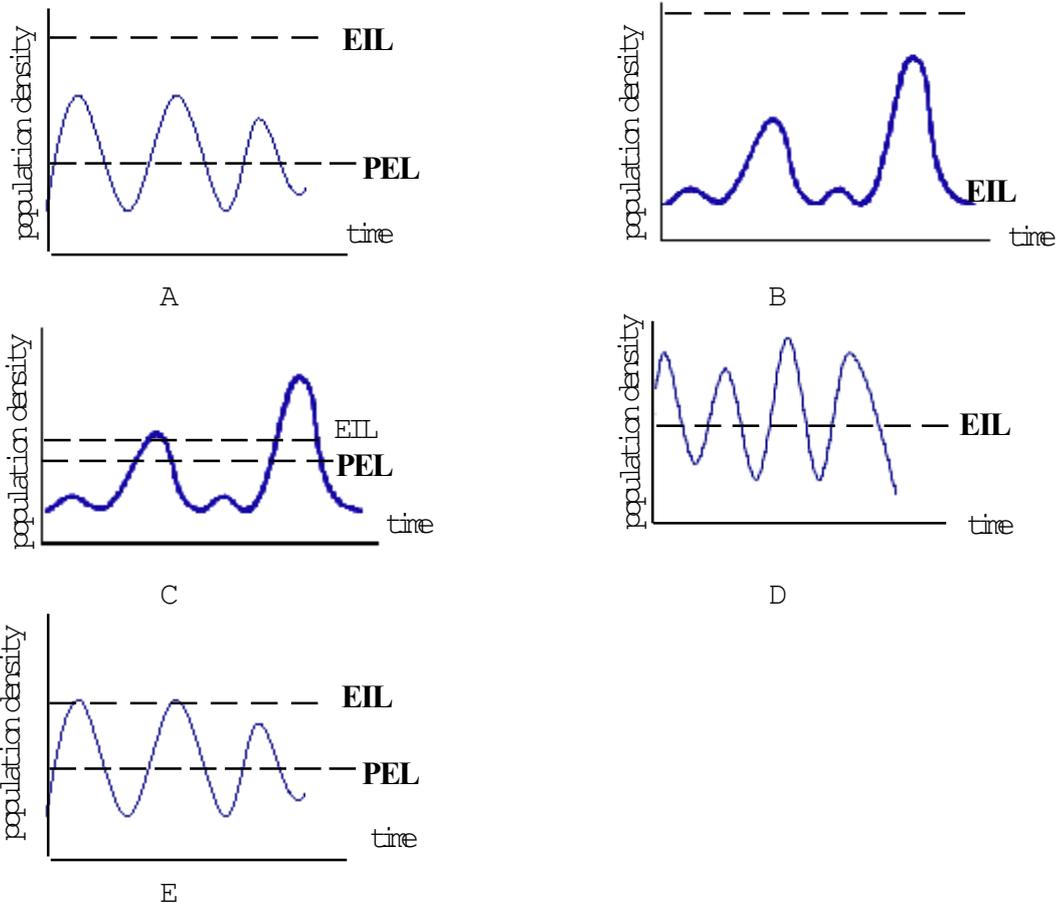
14. A few plant diseases are given below .

- A - Soft rot, vascular wilt, root knot disease
- B - Leaf curl complex, soft rot disease, Anthracnose
- C - Root knot disease, W eligara wilting, vascular wilt
- D - Leaf yellowing, soft patches, leaf curl complex

Out of them, bacterial disease/s is/are,

- (1) A and B only.                      (2) B and D only.                      (3) C and D only .
- (4) B only.                              (5) D only .

15. The following graphs indicate relationship between pest population density and time



From above graphs pest attacks rarely occurs in,

- (1) A.                                      (2) B.                                      (3) C.                                      (4) D                                      (5) E.



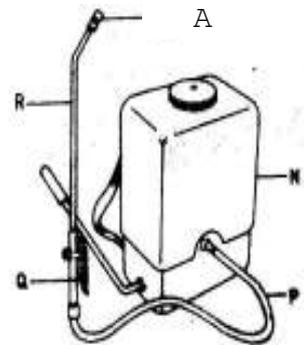
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24. The group of insect pests that belongs to Coleopteran is,  
(1) Paddy bug, Aulacaphora, Apilachna.  
(2) Apilachna, aulachaphora and banana stem borer .  
(3) Sweet potato weevil, wolf spider , Dragon fly .  
(4) Tortoise beetle, Banana stem borer and plant hopper .  
(5) Plant hopper , wolf spider and dragon fly .
25. A disease spread through seeds is,  
(1) Potato blight. (2) Sorghum seed browning disease.  
(3) Papaw Powdery mildew. (4) Chillie leaf curl complex.  
(5) Coffee rust disease.
26. A student mentioned following as the factors to be considered when a pesticide is registered  
A - Active period of the pesticide  
B - Toxicity  
C - Bio-degradable condition  
D - Price  
E - Manufactured company

The correct statements from above are,

- (1) A, B and C. (2) A, B and D. (3) A, D and E.  
(4) A, B, C and D. (5) A, C, D and E.
27. The diagram shows a Knapsack typed sprayer . The function of the part marked as 'A' is  
(1) dispersing liquids as tiny droplets.  
(2) moving the piston in the cylinder .  
(3) filtering impurities in the pesticides when putting into the tank.  
(4) allowing or stopping spraying of pesticide when needed.  
(5) storing compressed air and liquid.



28. *Lantana camara* weed is,  
(1) an annual sedge. (2) a perennial grass.  
(3) a perennial broad leaf plant. (4) a perennial sedge.  
(5) an annual grass.
29. A factor that help to identify paddy cultivation affected by a nodal worm is,  
(1) shoots of the plants become yellowish. (2) moths, have wings with a black dot.  
(3) caterpillars with segments. (4) white egg lump.  
(5) browning of paddy leaves.
30. Post emergency weedicide means, a weedicide that,  
(1) kills weeds by having cell division as a result of hormone activity .  
(2) is applied before or after the plant establishment .  
(3) is applied before or after sowing.  
(4) is applied before sowing seeds to absorb, when the plants grow they kill the weed growing.  
(5) is applied after seed germination.

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31. A group of insect pests that shows the complete metamorphosis is,  
(1) yellow stem borer, lime butterfly, Illmassa.  
(2) coconut black beetle, locust and ants.  
(3) Brown plant hopper, Banana stem weevil and Apilachna.  
(4) Fruit fly, Red cotton bug and moth.  
(5) Paddy bug, plant hopper, bean fly.
32. The pest group that includes only rodents is,  
(1) bat, bell rat and parrot. (2) bell rat, porcupine and wild bore.  
(3) peacock, deer and squirrel. (4) porcupine, wild bore and squirrel.  
(5) squirrel, elk and munia.
33. The marigold symptom occur in plant due to,  
(1) bacterial infection. (2) virus infection.  
(3) fungal infection. (4) Nematoda infection.  
(5) phytoplasma infection.
34. Calibrating a sprayer used for pest control is important to,  
(1) reduce environmental pollution. (2) prepare correct diluted solution.  
(3) maintain the tank correctly. (4) decide the correct dosage.  
(5) decide the type of pesticide.
- The following are few weeds found in the fields. Answer 35 to 37 questions based on this.  
A - Barnyard millet/Wel maruk  
B - Kudamatta  
C - Blue snake weed/Balu nakuta  
D - Kok mota  
E - Giant mimosa
35. The sedges are,  
(1) A and B, (2) A and C, (3) A and D.  
(4) B and D, (5) A and E,
36. A grass is,  
(1) A. (2) B. (3) C. (4) D. (5) E.
37. An invasive weed is,  
(1) A. (2) B. (3) C. (4) D. (5) E.
38. The group that includes insect families with incomplete metamorphosis is,  
(1) Thysanoptera, Lepidoptera and Diptera.  
(2) Lepidoptera, Hemiptera and Diptera.  
(3) Homptera, Hemiptera, Thysanoptera.  
(4) Thysanoptera, Homoptera and Diptera.  
(5) Hemiptera, Odoptera and Lepidoptera.

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39. A few statements on pesticides are given below.

- A - Translocation pesticides are the pesticides that enters into the body through cuticle to kill the pest
- B - It is not suitable for usage as residues of pesticides of organic chlorine remains in the environment
- C - Toxicity is high in the pesticides which has lower LD50 value

The correct statements are,

- (1) A only.
- (2) B only.
- (3) C only.
- (4) A and B only.
- (5) B and C only.

40. A farmer noticed that his vegetable cultivation is affected by a disease. When the part of the diseased plant is put into the water he observed a thick secretion coming out of it. The agent of this disease is a,

- (1) Fungus.
- (2) Virus.
- (3) Bacteria.
- (4) Nematoda.
- (5) Protozoa.

41. The causal agent that attack to plants through insect vectors is,

- (1) Bacteria.
- (2) Fungus.
- (3) Nematodes.
- (4) Virus.
- (5) Protozoa.

42. A student mentioned that following data are required to calibrate a sprayer .

- A - Capacity of the tank
- B - Amount of liquid applied to a hectare
- C - Quantity of pesticides in the pesticide bottle
- D - Amount of pesticides mixed to a tank

The correct statements are,

- (1) A and B only.
- (2) A and C only.
- (3) A and D only.
- (4) A, B and C only.
- (5) A, B and D only.

43. A reason for not pressurizing the liquid in the pressure chamber of the sprayer machine would be,

- (1) binding carbon in the ignitable plug.
- (2) blocking the tap of the fuel tank.
- (3) weakening of air cleaner .
- (4) trapping wastes in the nozzle.
- (5) suction valves and spill bottle valves are no working properly .

44. The weed shown in the picture is,

- (1) Salvinia.
- (2) Water hyacinth.
- (3) water cabbage.
- (4) Diya Habarala.
- (5) Pistia.



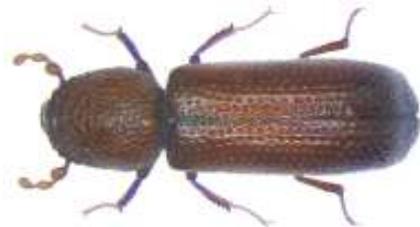
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45. The sedges belong to family ,  
(1) Poaceae. (2) Palmae. (3) Cyperaceae.  
(4) Arecaceae. (5) Cruciferaea.
46. The causal agent attacking the root system shown in the picture is  
  
(1) Bacteria.  
(2) Fungus.  
(3) Virus.  
(4) nematode.  
(5) Protozoa.
47. The correct statement related to pesticide application is, the pesticide  
(1) should continuously be sprayed as far as possible by one person.  
(2) bottle should be recycled after application.  
(3) should be applied perpendicular to the wind direction.  
(4) if a person is exposed, body should be cleaned with soap.  
(5) nozzle should be cleaned when it is blocked while cleaning.
48. The colour of the bottom boarder of the labels of the containers which have less toxic class II pesticide is,  
(1) red. (2) blue. (3) yellow. (4) green. (5) white.
49. If the capacity of a liquid sprayer is X litres, amount is chemicals applied per hectare is Y litres and the amount of liquid per hectare is Z, the quantity of chemical to be added to the tank is,  
(1)  $X+Y/Z$ . (2)  $X/Y/Z$ . (3)  $XxY/Z$ .  
(4)  $X-Y/Z$ . (5)  $XxY/Z$ .
50. An organic fungicide is,  
(1) cupravit. (2) thiram. (3) lime sulphate.  
(4) borob mixture. (5) copper sandoz.

## 12. Post Harvest Technology

1. Out of the given crops, a pulse crop is,  
(1) rice. (2) kurakkan. (3) meneri. (4) ground nut. (5) maize.
2. A cereal crop is,  
(1) green gram (2) cowpea (3) ground nut (4) thanahal (5) undu
3. The most suitable area to grow pulse crops in Sri Lanka is,  
(1) wet zone and dry zone. (2) wet zone and intermediate zone.  
(3) wet zone and upcountry. (4) dry zone and intermediate zone.  
(5) dry zone and wet zone.
4. The average percentage of post harvest lost in Sri Lanka, for fruits and vegetables is,  
(1) 20-30%. (2) 10-18%. (3) 35-40%. (4) 60-70%. (5) 5-10%.
5. The main objective of post harvest technology is to,  
(1) minimize the post harvest lost. (2) control the market price.  
(3) diversify the harvest. (4) use the different techniques.  
(5) utilize the excess harvest.
6. A Non-climetric crop is,  
(1) banana (2) avocado (3) mango (4) cashew (5) guava
7. The most suitable time duration for harvesting green vegetables and fruits is,  
(1) the dawn before the sun rise. (2) after setting sun, in the evening.  
(3) in the middle of the day or in noon. (4) after dew is settled in the morning.  
(5) between the noon and evening.
8. When the mango is harvested in the morning session,  
(1) it delays the ripening of mango.  
(2) it reduces the standard weight.  
(3) there could be burning patches on the mango skin.  
(4) it causes for rotting of the stalk.  
(5) it improves the colour of the skin..
9. The storage pest shown in picture is,  
(1) cowpea weevil.  
(2) red weevil.  
(3) Red flour weevil.  
(4) grain weevil.  
(5) rice weevil.



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10. The statements given below are on the ways of minimizing post harvest losses
- A – Usage of quality planting materials
  - B – Cultivate suitable crops
  - C – Harvesting should at the proper maturity stage.

The correct statements from the above are,

- (1) A only.
  - (2) B only.
  - (3) C only.
  - (4) A and B only.
  - (5) A and C only.
11. When cleaning the harvest, the hot water treatment is used to,
- (1) destroy all the micro – organisms on the fruit surface
  - (2) remove the impurities on the fruit surfaces
  - (3) control Antraxnose disease
  - (4) stimulate the fruit ripening
  - (5) obtain a bright colour for fruits.
12. A few statements given below are on effects in storing vegetables and fruits under low temperature.
- A – It protects the taste and the texture
  - B – It reduces the water removal
  - C – It stops respiration
  - D – It increases Ethylene production
- The correct statements from above are,
- (1) A and B only.
  - (2) A and C only.
  - (3) A and D only.
  - (4) B and D only.
  - (5) B,C and D only.
13. The most appropriate conditions to store vegetables and fruits are,
- (1) high temperature and high humidity.
  - (2) low temperature and low humidity.
  - (3) low temperature and high humidity.
  - (4) high temperature and high humidity.
  - (5) equal levels of temperature and humidity.
14. The main reason for the post harvest losses occurred in vegetables is,
- (1) mechanical damages.
  - (2) chemical damages.
  - (3) insect damages.
  - (4) pests which are not insects.
  - (5) microbial infections.
15. An example for the storage pest is,
- (1) red beetle.
  - (2) black beetle.
  - (3) red weevil.
  - (4) epilakna.
  - (5) mites.
16. Sri Lankan staple food belongs to the order of,
- (1) Solanaceae.
  - (2) Gramineae.
  - (3) Arecaceae.
  - (4) Cucurbitaceae.
  - (5) Solanaceae.

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17. A group of tuber crops grown in Sri Lanka as seasonal crops is,  
(1) Coco yam, Innala, Keedaran. (2) Dandila, Udala, Sweet potato.  
(3) Kukulala, Manioc, Coco yam. (4) Kukulala, Innala, Sweet potato.  
(5) Manioc, Innala, Potato.
18. Fruits can be protected by dipping them in hot water for a small time period. The temperature of water that can be treated for the fruits such as Mango and papaw is  
(1) 40-42 °C. (2) 42-45 °C. (3) 45-52 °C.  
(4) 52-55 °C. (5) 55-57 °C.
19. A few types of crops are given below.  
A. Sweet potato  
C. Beetroot  
B. Coco yam  
D. Innala
- Out of the crops from the above, yam crops are,  
(1) A and B only. (2) A and C only. (3) A and D only.  
(4) A, B and C only. (5) A, B and D only.
20. The post harvest losses means, the damage occur,  
(1) from the harvesting to marketing.  
(2) from the pre - harvesting to post harvesting.  
(3) from the point of harvesting until consuming.  
(4) from the pre harvesting until consuming.  
(5) in quantitatively.
21. A certain fruit crop has the following features,  
A - The volume and the weight is high  
B - High outer surface thickness  
C - Low level of moisture content of fruits
- From all above features the fruit category which can be preserved, exhibits the features in,  
(1) A only. (2) B only. (3) A and B only.  
(4) A and C only. (5) B and C only.
22. A fruit that should be harvested after maturing in the tree itself is,  
(1) banana. (2) avocado. (3) mango.  
(4) grape. (5) papaw.
23. The correct answer including the group of pulse crop is,  
(1) green gram, cow pea, lentils, ground nut.  
(2) soya beans, pigeon pea, meneri, kurakkan.  
(3) sorghum, Thanahal, lentils, Soya Bean.  
(4) ground nut, cowpea, sorghum.  
(5) pigeon pea, Soya bean, Maize, Meneri.

***(A/L) Agricultural Science - Multiple Choice Questions and Answers***

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24. The maximum post harvest losses occur in,  
(1) chillie. (2) beet root. (3) tomato.  
(4) leaks. (5) brinjal.
25. The features of three types of fruits named A, B, and C are listed as follows.  
A – 80% of moisture content  
B – high weight  
C – high thickness of the skin

The feature / s of a fruit that can be preserved is/are,

- (1) A only. (2) B only. (3) C only.  
(4) A and C only. (5) B and C only.
26. The reason for rotting of stalk in fruits such as Avacado and pineapple is,  
(1) harvesting before the specified maturity.  
(2) not storing in specified storage conditions  
(3) not harvesting properly.  
(4) not grading properly.  
(5) not transporting and packing properly.
27. A few reasons for minimizing post harvest losses are given below  
A – Manuring the crop properly.  
B – Thinning out of fruits.  
C – Packaging fruits properly  
D – Planning of a drainage system for the crop cultivations

The correct statements from the above are,

- (1) A and B only. (2) A and D only. (3) A, B and C only.  
(4) A, B and D only. (5) B, C and D only.
28. A few types of trees are given below.  
A – Neem  
B – Lime  
C – Nika  
D – Ipil Ipil

From the above, trees that used for controlling storage pests are,

- (1) A and B only. (2) A and C only. (3) A, B and C only.  
(4) A, B and D only. (5) B, C and D only.
29. The most suitable stage for harvesting is,  
(1) when the outer cover of avacado is brightly shine.  
(2) when the flowering stalk comes out in lettuce.  
(3) after the kitene substances are formed in grapes.  
(4) after the fibre content is increased in beans.  
(5) after the carrot becomes woody.

**(A/L) Agricultural Science - Multiple Choice Questions and Answers**

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30. When harvesting fruits before the proper maturity, the result is,  
(1) increasing of weight. (2) improving its colour .  
(3) improving the odour . (4) increasing the fibre content.  
(5) increasing the post harvest losses.
31. The maximum post harvest loss in grains occurs at,  
(1) harvesting. (2) separating grains.  
(3) storing. (4) boiling.  
(5) producing rice.
32. The maximum post harvest loss in grains occurs, when the harvest is,  
(1) stored and produced rice. (2) harvested and cleaned.  
(3) dried and boiled. (4) stored and dried.  
(5) separated and boiled.
33. The most suitable time period of harvesting fruits such as mangoes and citrus is,  
(1) before 7 am – and after 5 pm. (2) during 7.00 am and 10.00 am.  
(3) during 10.00 am and 3.00 pm. (4) after 6.00 pm.  
(5) at twelve noon.
34. The most suitable time to harvest banana is,  
(1) during 6.00 am to 10.00 pm. (2) after 6.00 and after 5.00 pm.  
(3) during 10.00 am to 2.00 pm. (4) before 10.00 am and 3.00 pm.  
(5) after 1.00 pm.
35. Post harvest loss occurs as a result of the disease called anthracnose. The causal agent of this disease is a,  
(1) fungi. (2) bacteria. (3) virus. (4) protozoa. (5) nematoda.
36. Normally the percentage value of Post harvest loss Sri Lankan grain is,  
(1) 12%. (2) 18%. (3) 21%. (4) 35%. (5) 40%.
37. When boiling rice,  
(1) carbohydrates are converted into glucose.  
(2) proteins are converted into amino acids.  
(3) carbohydrate is gelatinized.  
(4) fat is converted into fatty acids.  
(5) rice bran is removed.
38. Following statements are stated by a student regarding the reasons of dipping fruits such as papaw and mango in hot water about 45<sup>0</sup>C temperature.  
A – To reduce fungal attacks  
B– To make ripe quickly  
C– To change the skin colour
- The true statement / s is  
(1) A only (2) B only (3) C only  
(4) A and B only (5) A and C only
-

***(A/L) Agricultural Science - Multiple Choice Questions and Answers***

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39. The post harvest technology Institute of Sri Lanka is situated in,  
(1) Nuwara Eliya.                      (2) Anurachapura.                      (3) Gannoruwa.  
(4) Polannaruwa.                      (5) Hambantota.
40. A post harvest techniques which helps to reduce the post harvest loss in the storage of paddy are,  
(1) drying and cleaning of paddy before storage.  
(2) cleaning and painting the stores before storage.  
(3) before storage packing in bags and stacking up the bags in the stores.  
(4) cleaning paddy before storage and staking up the bags in the stores.  
(5) washing the instruments and drying bags before storing paddy.
41. In the process of rice processing, the directly affecting factor on nutritional value of rice is  
(1) removal of stones, grading and drying.  
(2) removal of stones, removal of bran and packing.  
(3) drying, removal of bran, and boiling.  
(4) grading, removal of bran and boiling.  
(5) removal of stones, drying and packing.
42. Before storing the paddy seeds, they should be dried up until the moisture content becomes,  
(1) 4%                      (2) 8%                      (3) 1%                      (4) 18%                      (5) 21%
43. A pre harvesting factor which helps to determine the post harvest loss is,  
(1) the storage conditions.  
(2) the demand in market.  
(3) washing with water after picking.  
(4) the pests controlling in crop cultivation.  
(5) the weather conditions exists in harvesting.
44. The important factors in the stores need to be concerned when storing fruits and vegetables are,  
(1) nitrogen amount and light intensity.  
(2) carbon dioxide concentration and temperature.  
(3) temperature and Atmospheric Oxygen concentration.  
(4) air circulation and relative humidity.  
(5) temperature and Relative humidity.
45. The crops that can be successfully grown in all the climatic zones except in upcountry wet zone is,  
(1) tomato and leaks.                      (2) ladies fingers and tomato.  
(3) tomato and ladies fingers.                      (4) leaks and beans.  
(5) beans and ladies fingers.

**(A/L) Agricultural Science - Multiple Choice Questions and Answers**

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46. A few statements regarding action taken to prevent crop damage caused in packing and transport of papaw crops are given below.
- A. Transporting them in plastic containers
  - B. Wrapping them in paper immediately after harvest and transporting them
  - C. Transporting by lorry on day time
  - D. Use of smooth surface wooden crate for transport

When considering the above statements, the most appropriate technical post harvest method mentioned are,

- (1) A and B only.
- (2) A and C only.
- (3) A and D only.
- (4) B and C only.
- (5) C and D only.

47. The main steps of post harvest techniques for rice is given below
- A. grading
  - B. packing
  - C. milling
  - D. boiling

What is the correct order of them?

- (1) A → D → C → B
- (2) D → C → A → B
- (3) C → A → D → B
- (4) A → B → C → D
- (5) A → C → D → B

48. The damage shown in picture is,
- (1) pre harvest damage by red weevil.
  - (2) post harvest damage by cowpea weevil.
  - (3) pre harvest damage by maize weevil.
  - (4) pre harvest damage by epilachna.
  - (5) post harvest damage by bean fly.



49. A few statements regarding climatic fruits by a student are given below.
- A - Ethylene gas is produced slightly
  - B - Fruits are ripened by using carbide
  - C - After being picked, fruits are unable to continue ripening
  - D - The rate of respiration of fruit is increased after being picked

The correct statements in the above are,

- (1) A and B only.
- (2) A and C only.
- (3) A and D only.
- (4) B and D only.
- (5) C and D only.

50. The reason for picking an avacado with a stalk is to,
- (1) reduce the secretion of sap.
  - (2) control affecting anthracose fungi.
  - (3) pack easily.
  - (4) do hot water treatment easily.
  - (5) pick easily.

### 13. Home gardening and Paddy Cultivation

- The crop group that ensures food security of a home garden is,
  - vegetables, green leaves, herbs.
  - kiri ala, jack and anthurium.
  - foliage plants, chillie, weli ala.
  - kiriala, manioc and jack.
  - long beans, winged bean and chillie.
- A few statements made by a student related to paddy plant is given below.  
A – There is a good potential in equatorial countries.  
B – Since the optimum temperature for tillering is 32<sup>o</sup>C - 34<sup>o</sup>C, can get maximum number of plants.

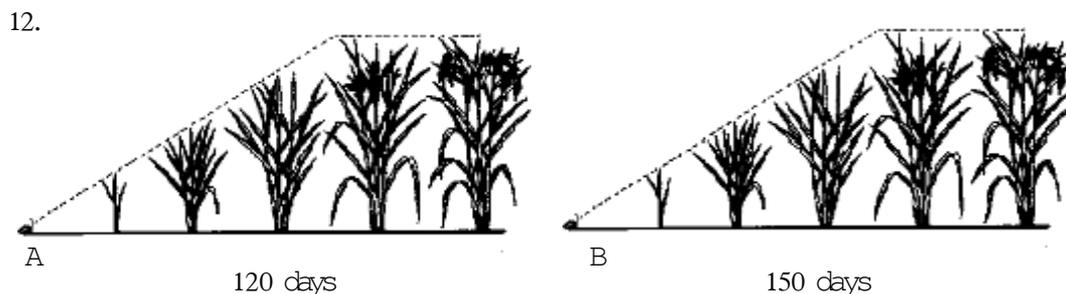
From the above statements,

- A statement is correct whereas B is incorrect.
  - A is incorrect whereas B is correct.
  - A and B are correct whereas B does not explains A.
  - A is correct and A explains B.
  - Both A and B are incorrect.
- Harvesting period of Yala season is,
  - February–March. (2) August–September .
  - December – January . (4) September –October .
  - November – December .
- Time period of keeping paddy in ‘Dapog’ nursery is,
  - 05 – 07 days. (2) 10 – 14 days. (3) 16 – 18 days.
  - 19 – 22 days. (5) 27 – 31 days.
- Paddy variety according to the number of days of the growth period,  
A –Varies  
B – Commonly growth and reproductive periods are same  
C– Age of the variety mostly depend on growth period  
  
The correct statement/s from the above is/are,
  - B only. (2) A and B only. (3) A and C only.
  - B and C only. (5) All A, B and C.
- The growth period of a paddy plant is the,
  - seedling stage.
  - period from flower bud to maximum number of bushes.
  - stage that shows highest tillering.
  - nursery stage.
  - period from seed germination to flower bud initiation.

**(A/L) Agricultural Science - Multiple Choice Questions and Answers**

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7. A strategy to get the maximum benefit of the sun light to home gardens is,  
(1) polytunnels. (2) hydroponics.  
(3) cultivation racks. (4) multi-layer crop cultivation.  
(5) mono crop cultivation.
8. Crop group which can be grown in a home garden includes medicinal plants, food flavours, green manure respectively is,  
(1) Asparagus, Gotha mala, Nika, Wild sunflower .  
(2) Ginger, Curry leaves, Undupiyaliya, Wild sunflower .  
(3) Asparagus, Pawatta, Sera, Glycrisidia.  
(4) Rampa, Curry leaves, Undupiyaliya, Ipil Ipil.  
(5) Pawatta, Curry leaves, gothamala, glyderidia.
9. The growth stage and the reproduction stage of a certain paddy variety is 30 days and 35 days respectively . This paddy variety is,  
(1) three months paddy variety . (2) four months paddy variety .  
(3) photosensitive paddy variety . (4) four and half months paddy variety .  
(5) five months paddy variety .
10. Age of a paddy variety is mainly determined according to the,  
(1) growth period.  
(2) reproduction period.  
(3) Maturity stage.  
(4) time periods of growth and reproductive stage.  
(5) time periods of reproductive and maturity stages.
11. Fertilizer application for paddy cultivation is needed to get a yield with greater weight and few empty seeds. Fertilizer should be applied at the,  
(1) planting stage. (2) tillering stage.  
(3) pinnacle formation. (4) flower initiation stage.  
(5) grain setting stage.



- When consider A and B paddy plants in the above diagrams, the,  
(1) growth periods are same in both varieties.  
(2) growth stage of A is 30 days whereas that of B is 35.  
(3) maturity period of A is 30days whereas that of B is 35days.  
(4) growth period of A is short and growth stage of B is long.  
(5) growth stage of B is shorter than A.

**(A/L) Agricultural Science - Multiple Choice Questions and Answers**

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13. Yield is determined by the number of seeds in a panicle. This is determined at the,
- (1) vegetative phase.
  - (2) tillering stage.
  - (3) grain setting stage.
  - (4) flower initiation stage.
  - (5) initial stage of reproductive phase.
14. Select the correct statement related to tillering of paddy plant, the,
- (1) cultivation method does not affect on tillering.
  - (2) variety is not a factor that affect on tillering.
  - (3) distance between plants does not affects on tillering.
  - (4) cultivation method, soil fertility and the variety do not affect on tillering.
  - (5) optimum plant population can get by applying more nitrogen fertilizer.
15. Paddy cultivation damaging lepidopterist is a,
- (1) plant hopper.
  - (2) brown plant hopper.
  - (3) paddy bug.
  - (4) yellow stem borer.
  - (5) gall midge.
- A few pest control methods used in paddy cultivation are given below. Answer question number 16 to 18 using them.  
A - Light traps  
B - Flooding  
C - Cultivate all fields at once  
D - Use resistant varieties  
E - By predators  
F - Maintain crop sanitation
16. A mechanical method to control pests of paddy cultivation is,
- (1) A and B only.
  - (2) B and C only.
  - (3) C and D only.
  - (4) D and E only.
  - (5) E and F only.
17. Agronomic practice to control pests are,
- (1) C and D only.
  - (2) B, E and F only.
  - (3) C, D and E only.
  - (4) D, E and F only.
  - (5) C, D and F only.
18. Mechanical/physical method to control pests such as Paddy bug, moths, mites is /are,
- (1) A only.
  - (2) B only.
  - (3) A and C only.
  - (4) A and D only.
  - (5) B and C only.
19. The group of fungal diseases of paddy is,
- (1) leaf scald, sheath blight, brown spot.
  - (2) sheath blight, bacteria blight, leaf scald.
  - (3) bacteria blight, soft brown leaf spot disease, leaf smut.
  - (4) leaf scald, soft brown leaf spot disease, Tooth go virus disease.
  - (5) wilting wilt, bacterial wilt, and damping off.

***(A/L) Agricultural Science - Multiple Choice Questions and Answers***

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20. Suitable time to harvest paddy is determined when,
- (1) 85% of leaves are become golden in colour .
  - (2) all leaves become golden in colour .
  - (3) 85% of leave and pinnacles are in gold colour .
  - (4) 85% of seeds in pinnacles are gold in colour .
  - (5) all the paddy pinnacles are bent due to its weight.
21. The nutrient element that is can be received to the soil by putting hay to the field is,
- (1) K                      (2) S                      (3) N                      (4) P                      (5) K
22. A few statements on a home garden made by two persons are given below.
- A - Home garden only gives subsistence benefits  
B - No potential yield from home gardening due to limitations of natural resources, competition and marginality
- The correct statements according to the above statements,
- (1) A is correct whereas B is incorrect.
  - (2) A is incorrect whereas B is correct.
  - (3) Both A and B are incorrect.
  - (4) A is correct whereas B explains A.
  - (5) B is correct whereas A explains B.
23. Four months rice variety which is suitable to dry zone is resistant to brown plant hopper . This rice variety is,
- (1) Bg 300.              (2) At 140.              (3) Id 365.              (4) Bg 403.              (5) Bg 745.
24. The suitable pH range for Paddy is,
- (1) 3.2 - 4.5                      (2) 6.5 - 7.2                      (3) 4.5 - 7.2  
(4) 5.5 - 6.5                      (5) 7.5 - 8.5
25. Main factor that affects the yield from paddy plant is,
- (1) number of pods.                      (2) number of bushes.  
(3) number of flowers.                      (4) environmental factors.  
(5) number of plants per unit area.
26. For a 4½ months rice variety, land preparation in Maha season should be done during,
- (1) 25<sup>th</sup> March - 15<sup>th</sup> April.                      (2) 10<sup>th</sup> May - 31<sup>st</sup> May.  
(3) 25<sup>th</sup> September - 15<sup>th</sup> October.                      (4) 10<sup>th</sup> October - 30<sup>th</sup> October.  
(5) 10<sup>th</sup> November - 30<sup>th</sup> November.
27. Sowing of BG 300 was done during 15<sup>th</sup> - 31<sup>st</sup> May 2014. The suitable time to harvest this paddy variety is,
- (1) before 10<sup>th</sup> February 2015.
  - (2) between 15<sup>th</sup> August 2014 to 15<sup>th</sup> September 2014.
  - (3) before 15<sup>th</sup> October 2014.
  - (4) before 10<sup>th</sup> December 2014.
  - (5) during 15<sup>th</sup> - 30<sup>th</sup> September 2014.

***(A/L) Agricultural Science - Multiple Choice Questions and Answers***

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28. The moisture content of seed paddy should be,  
(1) 5-8%      (2) 08-10%      (3) 12-13%      (4) 13-15%      (5) 15-18%
29. Land preparation for paddy cultivation should be started,  
(1) 3 days before the plant establishment.  
(2) 7 days before the plant establishment.  
(3) 14 days before the plant establishment.  
(4) 21 days before the plant establishment.  
(5) 30 days before the plant establishment.
30. After turning the soil, germinated seeds are sown in the field which is completed tilling and levelling and seed germination starts with the monsoon rains. This paddy cultivation is known as  
(1) parachute method.      (2) Sri method.  
(3) kekulan method.      (4) dry land farming.  
(5) biological dynamic farming.
31. The suitable land area for Wet bed nursery from total land area is,  
(1) 1/10      (2) 1/8      (3) 1/5      (4) 1/4      (5) 1/2
32. When the seed paddy preparing, the seeds should be soaked in water for,  
(1) 6 hours.      (2) 12 hours.      (3) 24 hours.  
(4) 48 hours.      (5) 72 hours.
- Use the following information to answer the question number 33 and 34  
A - Number of pods per unit area  
B - Number of spikelet in a pod  
C - percentage of filled capsules  
D - Weight of a grain seed  
E - Number of bushes  
F - Number of flowers in the inflorescence
33. The parameters of paddy harvest are,  
(1) A, B, C and D.      (2) A, C, D and E.      (3) A, D, E and F.  
(4) B, C, D and E.      (5) C, D, E and F.
34. More varying and limiting factor that affects home gardening food production is,  
(1) soil.      (2) nutrients.      (3) space.  
(4) water.      (5) sunlight.
35. Rice plant can differentiate from a grass since rice plant has,  
(1) ligules only.  
(2) ledules only.  
(3) ligules and ledules.  
(4) in addition to ligules, ledules are there.  
(5) cylindrical holes in the stem.

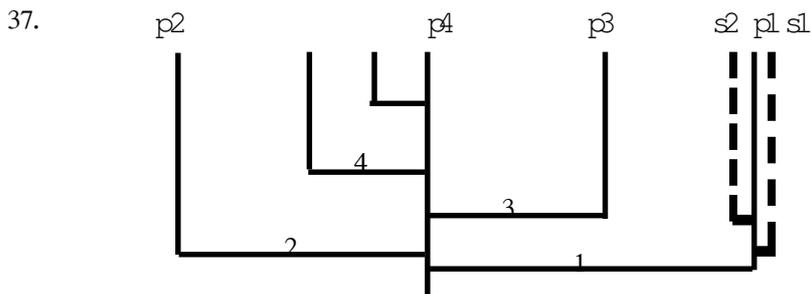
**(A/L) Agricultural Science - Multiple Choice Questions and Answers**

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36. A few statements related to weed control in paddy cultivation is given below.
- A – Most of the weeds belong to family Graminae can be controlled by flooding upto 5- 10cm height
  - B – Manual weeding is more efficient than the weeder
  - C – W eeds can be controlled by planting paddy plants will less distances

The correct statement from the above is/are,

- (1) A only.
- (2) B only.
- (3) A and B only.
- (4) A and C only.
- (5) B and C only.



According to the above diagram on tillering,

- (1) 1 and 2 are the primary bushes while 3 and 4 are the secondary bushes.
  - (2) 1, 2, 3 and 4 are the primary bushes whereas p1 and p2 are the secondary bushes.
  - (3) p1, p2 and p3 are the primary bushes.
  - (4) p1, p2 and p3 are the primary bushes whereas s1 and s2 are the secondary bushes.
  - (5) p2, p3 and p4 are the secondary bushes.
38. Seed paddy is soaked for 24 hours, make a heap on the floor covered with banana leaves or polythene, heap of the seed paddy is covered with a wet gunny bag and keep a weight on it. This is a process used,
- (1) to increase viability of seeds
  - (2) for stratification.
  - (3) for establishing seeds.
  - (4) for seed germination.
  - (5) for seed disinfection.
39. Definition for the percentage of successful tillers is the,
- (1) percentage of the ratio of difference between the highest number of produced tillers and number of produced pods.
  - (2) percentage of the ratio of difference between the number of produced pods and maximum number of tillers produced.
  - (3) Percentage of the ratio of difference between the maximum number of produced tillers to the number of produced seeds.
  - (4) Percentage of the ration of difference between number of produced seeds and maximum number of produced tillers.
  - (5) Percentage of the ratio of difference between the maximum number of leaves to the number of seeds produced.

***(A/L) Agricultural Science - Multiple Choice Questions and Answers***

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40. Number of tillers of a rice variety is 8 and number of pods is 6. The successful tiller percentage of the variety is,  
(1) 20%      (2) 25%      (3) 60%      (4) 75%      (5) 80%
41. Out of following districts, the highest paddy production is recorded in,  
(1) Jaffra                      (2) Polonnaruwa                      (3) Ampara  
(4) Anuradhapura              (5) Hambantota
42. The paddy variety At450 is known as Lanka Samudhi. Age of this variety which has similar characteristics to Basmati rice is,  
(1) 2 ½ months.              (2) 3 months.                      (3) 3 ½ months.  
(4) 4 months.              (5) 4 ½ months.
43. Out of following paddy varieties, the variety of 3 months red rice, which is tolerant to iron toxicity is,  
(1) Bg 306.                      (2) Bg 364.                      (3) Id 408.  
(4) Bg 379-2.              (5) Bg 403.
44. In wet bed cultivation of paddy, soil fertility can enhance by adding hay to the soil later. The stage which hay should be added to the soil is at,  
(1) the first ploughing.      (2) second ploughing.              (3) tillage.  
(4) leveling.              (5) sowing.
45. Paraquat weedicide should be applied to the paddy field,  
(1) before the first ploughing.              (2) before second ploughing.  
(3) Immediately after sowing.              (4) After sowing before germination.  
(5) After seed germination.
46. Post harvest losses of paddy mainly occurs at,  
(1) harvesting and cleaning.              (2) sorting seeds and parboiling.  
(3) storing and processing.              (4) drying and processing.  
(5) Cleaning and parboiling.
47. Paddy fly which damages paddy cultivation belongs to the class,  
(1) Lepidoptera.              (2) Diptera.                      (3) Isoptera.  
(4) Hymenoptera.              (5) Hemiptera.
48. A few benefits of a home garden are given below.  
A - Enhancing mental development  
B - Contribution to the bio-diversity conservation  
C - Earning income for family needs  
D - Saving the time spending in the market
- From the above benefits in the above, social benefits are,  
(1) A and B only.              (2) A and C only.                      (3) A and D only.  
(4) B and C only.              (5) C and D only.

***(A/L) Agricultural Science - Multiple Choice Questions and Answers***

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49. A few types of nurseries are given below.

- A - Dapog nursery
- B - Compact nursery
- C - Noridoko nursery
- D - Tray nursery

Nursery types used in paddy cultivation are,

- (1) A and B only.
- (2) A and C only.
- (3) A and D only.
- (4) B and C only.
- (5) B and D only.

50. Parachute method is used in,

- (1) sowing.
- (2) seedling sowing.
- (3) seedling planting.
- (4) seed planting.
- (5) seedling in nurseries.

## 14. Animal Husbandry

- The major function of cow's large intestine is,
  - enzymatic digestion
  - absorption of water
  - fat absorption
  - protein absorption
  - mechanical digestion
- The most suitable method to rear hens in a limited area is,
  - semi-intensive system.
  - deep litter system.
  - free range system.
  - hanging cage system.
  - battery cage system.
- Which of the following statements is incorrect about the milk production of animals?
  - Milk production increases during the first stage of lactation up to the third lactation and decreases thereafter .
  - Milking production increases in the first 6 – 8 weeks and then decreases gradually .
  - Nutrition during the dry period does not have any effect on milk production.
  - Milk production depends on animal species.
  - Milk production decreases due to illnesses.
- The lactometer reading for a milk sample was 1.020. According to this observation, the milk sample is adulterated with,
  - water .
  - skim milk.
  - formalin.
  - coconut milk.
  - lactose.
- Which following parameters are important when determining the percentage of solid non-fat in milk;
  - Lactose content protein content.
  - Optical density and fat percentage.
  - Globulin content and casein content.
  - Fat percentage and casein content.
  - Corrected lactometer reading and fat percentage.
- A few statements given below are on fat globules present in milk.
  - In milk, fat is present as globules
  - Fat globules in cow milk are smaller than those in goat milk
  - Homogenization breaks down milk fat into smaller globules

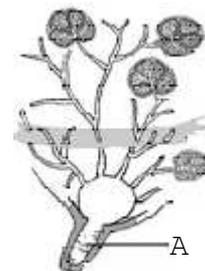
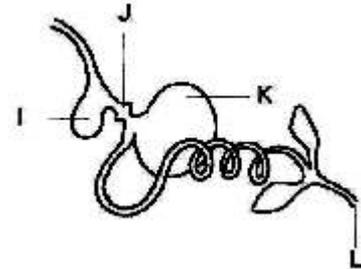
The correct statement/s from the above is/are,

  - A only.
  - B only.
  - A and B only.
  - A and C only.
  - B and C only.
- The vitamin which a cow will need in large amount is,
  - vitamin A.
  - vitamin B.
  - vitamin C.
  - vitamin D.
  - vitamin E.

**(A/L) Agricultural Science - Multiple Choice Questions and Answers**

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- 8.. The number of teeth in a mature cow are,  
(1) 14            (2) 20            (3) 24            (4) 30            (5) 32
9. In ruminant digestion process, the gas produced during the digestion of cellulose is,  
(1) nitrogen.            (2) methane.            (3) water vapour .  
(4) oxygen.            (4) carbon dioxide.
10. A diagram of a chicken's digestive system is given below.  
The function of part "J" in the diagram is the,  
(1) storage of food  
(2) mechanical digestion of food  
(3) chemical digestion of food  
(4) microbiological digestion of food  
(5) secretion of digestive enzymes
11. A flock of chickens shed excreted 35 kg of excreta within a 20 day study period and the moisture content of excreta was 55%. The dry matter content of this batch of excreta is,  
(1) 1.75 kg.            (2) 2.75 kg.            (3) 15.75 kg.  
(4) 19.25 kg.            (5) 20 kg.
12. In artificial insemination of cows, sperms are deposited in,  
(1) ovary.            (2) vagina.            (3) uterus.  
(4) fallopian.            (5) cervix.
13. Which of the following group including infectious diseases of cattle only,  
(1) milk fever , brucellosis, hemorrhagic septicemia.  
(2) brucellosis, mastitis, hemorrhagic septicemia.  
(3) milk fever , mastitis, bloat.  
(4) mastitis, bloat, pneumonia.  
(5) pneumonia, milk fever , mastitis.
14. The volatile fatty acids produced in the digestion process in a rumen are,  
(1) eliminated by eructation.  
(2) absorbed from the rumen wall.  
(3) eliminated with urine.  
(4) used to synthesize proteins within the body .  
(5) absorbed in the small intestine.
15. A diagram of a cow's mammary gland is given below. Part "A" of the diagram is,  
(1) alveoli.  
(2) mammary ducts.  
(3) gland cistem.  
(4) teat cistem.  
(5) teat meatus (Streak canal).



***(A/L) Agricultural Science - Multiple Choice Questions and Answers***

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16. When incubating chicken eggs using an artificial incubator, the transferring eggs is done from the incubation compartment to the hatching compartment after number of days,  
(1) 12                      (2) 15                      (3) 16                      (4) 18                      (5) 20
17. Which of the following is a plant origin protein supplement that is commonly used in the formulation of animal feed?  
(1) Soy ponac                      (2) Milk powder                      (3) Dry fish meal  
(4) Rice bran                      (5) Corn
18. Which of the following statement is correct about the egg?  
(1) There is very little air space in the pointed end of the egg.  
(2) A fresh egg has a small air cell.  
(3) Eggs with large air cells are suitable for incubation.  
(4) The air cell prevents microorganisms from entering the egg.  
(5) The air cell helps to protect eggs from the vibration damages.
19. Which of the following statement is correct about the digestive system of a cattle?  
(1) The esophageal groove is located between the rumen and the omasum  
(2) The omasum lining has a honeycomb appearance  
(3) Glands of the lining of rumen secrete cellulose-digesting enzymes  
(4) Oesophagus groove is located between rumen and omasum  
(5) Hemicellulose digestion occurs predominantly in the appendix
20. In Sri Lanka, the largest populations of cattle are recorded in,  
(1) mid-country and upcountry.  
(2) low-country wet zone and upcountry.  
(3) dry zone and coconut triangle.  
(4) upcountry and coconut triangle.  
(5) low-country wet zone and Jaffna peninsula.
21. The examples of fodder legumes used in the cattle feeding are,  
(1) Leucaena and Erythrina.                      (2) Leucaena and Pueraria.  
(3) Pueraria and Centrosema.                      (4) Erythrina and Stylosanthes.  
(5) Centrosema and Acacia.
22. Some infectious diseases seen in the cattles are given below.  
A - Pneumonia  
B - Brucellosis  
C - Mad cow disease  
D - Swine flu
- From the above listed diseases, zoonotic diseases are,  
(1) A and C only.                      (2) B and D only.                      (3) C and D only.  
(4) A,C and D only.                      (5) B,C and D only.

***(A/L) Agricultural Science - Multiple Choice Questions and Answers***

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23. The period when the highest milk production of a dairy cow has after calving is,  
(1) from 3 - 5 weeks.                      (2) from 6 - 8 weeks.                      (3) from 9 - 11 weeks.  
(4) from 12 -14 weeks.                    (5) from 15 - 17 weeks.
24. Lactation period of a cow is,  
(1) 130 days.                      (2) 175 days.                      (3) 205 days.  
(4) 305 days.                      (5) 385 days.
25. Hemocytometer is used to,  
(1) quantify the number of sperms in semen.  
(2) measure the density of egg white.  
(3) measure the blood hemoglobin content of farm animals.  
(4) measure the heartbeat of the cattles.  
(5) measure the body temperature of a day - old chicks.
26. The biggest challenge a breeder will face when employing a breeding programme for a cow is  
is  
(1) detecting the Oestrus.  
(2) assessing the activity of uterus.  
(3) identifying the disease conditions of ovaries.  
(4) assessing the activity of mammary system.  
(5) identifying the nutritional needs.
27. The period which the mammary glands of a cow attain the highest growth is,  
(1) before birth.                      (2) at the end of lactation.  
(3) at puberty                      (4) at the earlier stages of pregnancy .  
(5) during the dry period.
28. The chicken breed shown in the diagram would be,  
(1) Cochin.  
(2) Legon.  
(3) RIR.  
(4) English Game.  
(5) Plymouth Rock.



29. If a chicken weighs 03 kg at 35 days of age and its feed conversion ratio is 1.8, the quantity of feed it has consumed during 35 days is,  
(1) 0.6 kg      (2) 1.2 kg                      (3) 4.8 kg                      (4) 5.4 kg                      (5) 6 kg
30. Which of the following is an anatomical adaptation of a cow in response to elevated environmental temperatures?  
(1) Increased activity of sympathetic nervous system  
(2) Excessive secretion of saliva  
(3) Limited locomotion  
(4) Increased peripheral blood flow  
(5) Dilatation of blood vessels

**(A/L) Agricultural Science - Multiple Choice Questions and Answers**

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31. The farm animal that has the shortest generation interval is,  
(1) chicken.           (2) swine.           (3) cow.  
(4) goat.           (5) sheep.
32. When a farmer added a few drops of glycerin to a milk sample brought to the collection centre, the milk sample turned red. According to the observation, the conclusion is,  
(1) water.           (2) salt.           (3) wheat flour.  
(4) coconut milk.           (5) formalin.
33. If a heifer weighs 2.7 kg at the first pregnancy, the body weight at maturity is,  
(1) 270kg           (2) 360kg           (3) 405kg           (4) 540kg           (5) 810kg
34. A volatile fatty acid found in good quality silage is,  
(1) acetic acid.           (2) lactic acid.  
(3) butyric acid.           (4) propionic acid.  
(5) caproic acid.
35. "Yolk sac" infection is a disease that can be seen in;  
(1) day old chicks.           (2) grower hen.  
(3) layer hens.           (4) incubating hens.  
(5) 35-Days old broilers.
36. A farmer engaged in poultry farming observes that the faces gathered as white paste around the vent (cloaca) of some young chicks in the farm. The disease affected to these chicks is,  
(1) Pullorum disease.           (2) Gumboro disease.  
(3) Fowl pox.           (4) Ranikhet disease.  
(5) Coccidiosis.
37. Milk fever is seen in the cows due to the deficiency of a specific nutrient. It is,  
(1) Phosphorus           (2) Magnesium           (3) Calcium  
(4) Vitamin A           (5) Vitamin D



- In the above diagram, structure "A" plays an important role in a farm. Because it is,  
(1) providing drinking water to farm animals.  
(2) providing exercise facilities to farm animals.  
(3) protecting animals from diseases.  
(4) providing bathing facilities to farm animals.  
(5) disposing of waste.

***(A/L) Agricultural Science - Multiple Choice Questions and Answers***

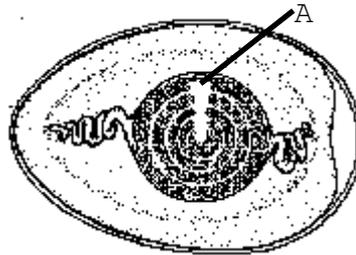
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39. Desirable group of microorganisms in the rumen include,
- (1) Bacteria and Viruses
  - (2) Protozoa and Bacteria
  - (3) Fungi and Virus
  - (4) Protozoa and Fungi
  - (5) Bacteria and Fungi
40. If a heterozygous rooster with a single comb is mated with a hen having a pea comb with recessive characteristics, The ratio of phenotypes in the progeny is,
- (1) 50% singlecomb and 50% pea comb.
  - (2) 100% single comb.
  - (3) 100% pea comb.
  - (4) 75% single comb and 25% pea comb.
  - (5) 25% single comb and 75% pea comb.
41. The chemical combinations that can be given to cows to prevent ketosis are,
- (1) dicalcium phosphate and calcium propionate.
  - (2) sodium propionate and propylene glycol.
  - (3) sodium bicarbonate and propylene glycol.
  - (4) dicalcium phosphate and niacin.
  - (5) sodium bicarbonate and niacin.
42. The dry period of a cow ranges from,
- (1) 20-40 days.
  - (2) 40-60 days.
  - (3) 60-80 days.
  - (4) 80-100 days.
  - (5) 100-120 days.
43. Three statements about hybrid vigor are listed below .
- A – Hybrid vigor is not transmitted from generation to generation
- B – Hybrid vigor helps in increasing the production capacity of the progeny
- C – Inbreeding is the most commonly used method to achieve hybrid vigor
- The correct statement/s from the above is/are,
- (1) A only.
  - (2) B only.
  - (3) A and B only.
  - (4) A and C only.
  - (5) B and C only.
44. Inside the rumen of ruminants,
- (1) cellulose in the feed is digested by cellulase enzyme secreted from rumen wall.
  - (2) acetic acid produced during the digestion helps to maintain the pH of abomasum.
  - (3) methane gas produced during the digestion helps to generate energy for body functions.
  - (4) non – protein nitrogenous matter is used to synthesize proteins.
  - (5) microbial digestion of lipids produce fatty acids and glycerol
45. The major carbohydrate and a protein contained in milk are,
- (1) fructose and lactose.
  - (2) lactose and casein.
  - (3) casein and lactose.
  - (4) lactose and fructose.
  - (5) sucrose and lysine.

**(A/L) Agricultural Science - Multiple Choice Questions and Answers**

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46. The diagram of an egg is given below.



The function of part "A" is;

- (1) development of the embryo.
- (2) facilitating air transfer .
- (3) anchoring the yolk in the center .
- (4) prevents microorganisms from entering the egg.
- (5) provides nutrients for the embryo.

47. Three statements regarding a horizontal egg incubator are given below .

A – Eggs are placed blunt end up

B – It can be used to hatch a small amount of eggs

C – Eggs are turned by hand

The correct statemen/s from the above is/are,

- (1) A only .
- (2) B only .
- (3) C only .
- (4) A and C only .
- (5) B and C only .

48. The correct statemen with regarding to the transportation of broiler chickens for slaughtering

is

- (1) transportation costs can be minimized by loading more chickens in a single transport box.
- (2) antibiotics should be given to birds before transportation to minimize stress.
- (3) difficulties faced by broilers during the transportation can be minimized by starvation of birds for 24 hours before transportation.
- (4) catabolism can be minimized by transporting birds during the brightly lit day time.
- (5) deaths due to excessive exhaustion can be minimized by providing drinking water to birds after transportation.

49 .A farmer decides to rear 10,000 broiler chickens in his farm for meat. If a broiler chicken costs Rs. 40.00 and the mortality rate is 4%, the cost for purchasing chicken is,

- (1) Rs. 41,600.00
- (2) Rs. 41,666.00
- (3) Rs. 3,84,615.00
- (4) Rs. 4,16,000.00
- (5) Rs. 4,16,666.00

50 .A farmer makes 50 kg of hay by air drying a batch of grass. If the moisture content of hay is 25%, the weight of the batch of grass used to produce hay is,

- (1) 25 kg
- (2) 75 kg
- (3) 100 kg
- (4) 150 kg
- (5) 200 kg

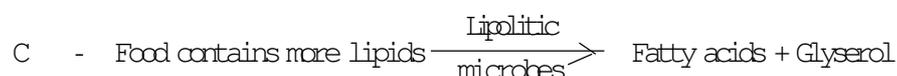
## 15. Food and Nutrition

- The main function of carbohydrate contained food which is consumed by man is,
  - contribution to the metabolic functions.
  - transporting in blood combining with protein.
  - providing energy for day today activities.
  - depositing in liver as a insoluble compounds.
  - building structural material in the body .
- It is believed that margarine which is produced by hydrogenating unsaturated fat is unhealthy .  
The acceptable reason for this is margarine contains,
  - single unsaturated fatty acids.                      (2) multi unsaturated fatty acids.
  - short string unsaturated fatty acids.              (4) short string saturated fatty acids.
  - long string saturated fatty acids.
- The poly-unsaturated fatty acids that is not formed in the human body is,
  - Stearic acid.    (2) Lauric acid.    (3)        Palmitic acid.
  - Linoleic acid.    (5)        Capric acid.
- A few statements on chemical composition of protein are given below .  
A – Contains only Carbon, Hydrogen and Oxygen.  
B – Contains Nitrogen in addition to Carbon, Hydrogen and Oxygen.  
C – Some proteins contain Sulphur and Phosphorus in addition to Carbon, Hydrogen, Oxygen and Nitrogen.  
D – Some proteins contain Sulphur and Phosphorus in addition to Carbon, Hydrogen and Oxygen.  
  
The correct statement/s from above is/ are,
  - A only.    (2) B only.    (3) C only.
  - B and C only.    (5) B and D only.
- The vitamin that cannot be produced in human body is,
  - vitamin A.    (2) vitamin B.    (3) vitamin C.
  - vitamin D.    (5) vitamin E.
- The illness that occurs as a result of unnecessarily high consumption of Iron is,
  - Hemofelia    (2) Bery bery.    (3) Himocromatis.
  - Kwashiocor    (5) Marsmus.
- The reason for changing the colour of a banana peel when the banana is kept in a refrigerator is due to,
  - protein is denaturated.
  - destroying vitamins.
  - changing colours since the tissues get burst.
  - increasing microbial activities.
  - the removal of moisture.

**(A/L) Agricultural Science - Multiple Choice Questions and Answers**

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8. The group of food that can be categorized under less acidic is,  
(1) Meat and Eggs. (2) Tomato and Murunga.  
(3) Soup and vegetables. (4) Pickle and Orange.  
(5) Chick pea and Greengram.
9. Process of producing peroxide and Hydrogen peroxide by reacting unsaturated fatty acids in a food with oxygen is known as,  
(1) hydrolyze rancidity. (2) reducing rancidity.  
(3) oxidizing rancidity. (4) reducing chain reaction.  
(5) enzymitic browning.
10. Carbohydrates  $\xrightarrow{\text{Microbes}}$  Acid + Alcohol + C O<sub>2</sub>  
Above equation shows,  
(1) Oxidizing rancidity. (2) Hydrolyzing rancidity.  
(3) Enzymatic browning. (4) Fermentation.  
(5) Maillard reaction.
11. Potato slices turn to brown in colour as a result of an enzymatic reaction. The enzyme that affect the browning is,  
(1) lipase. (2) catalase. (3) amylase.  
(4) phenols. (5) sucrase.
12. Reducing sugar and amino acids in a food produce brown colour sugar amino complexes by reacting under heat. This process is called,  
(1) caramalization. (2) maillard reaction.  
(3) enzymatic browning. (4) fermentation.  
(5) reducing rancidity.
13. A result non-enzymatic browning reaction is,  
(1) turning Black when a banana blossom is cut.  
(2) turning Brown when apple is cut in to slices.  
(3) giving inherent colour of dates and grapes.  
(4) blackening of tea leaves.  
(5) having golden brown in biscuits.
14. The reactions of the chemical and physical changes of food that happen as a result of microbial activities are given in the illustration below.



**(A/L) Agricultural Science - Multiple Choice Questions and Answers**

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- Above A, B and C reactions are respectively
- (1) rancidity, fermentation and putrefaction.
  - (2) rancidity, putrefaction and fermentation.
  - (3) fermentation, rancidity and putrefaction.
  - (4) putrefaction, fermentation and rancidity.
  - (5) putrefaction, rancidity and fermentation.
15. The most affecting factors for food spoilage by microbes are,
- (1) temperature, Relative humidity, air.
  - (2) temperature, moisture content and air.
  - (3) pH value, relative humidity and air.
  - (4) potential for reducing and oxidizing, pH value, moisture content.
  - (5) pH value, temperature, relative humidity.
16. Temperature range which food poisoning micro bacteria become inactive is,
- (1) -18 -32<sup>0</sup>C
  - (2) 0 - 5<sup>0</sup>C
  - (3) 0 -32<sup>0</sup>C
  - (4) 5 - 20
  - (5) 0 - -18<sup>0</sup>C
17. Microbial multiplication increases and toxic waste are produced within the temperature range
- (1) -18 - -32<sup>0</sup>C
  - (2) 0 - 5<sup>0</sup>C
  - (3) 5 - 65<sup>0</sup>C
  - (4) 65 - 100
  - (5) 45 - 65
18. Colour changes occur as a result of bacterial food poisoning. The chicken turns to green colour because of a bacteria. The bacteria responsible for this is,
- (1) Pseudomonas spp.
  - (2) Lactobacillus spp.
  - (3) Mucor spp.
  - (4) Penicillium spp.
  - (5) Agaricus spp.
19. A woman wanted to buy a packet of sausages. She noticed that there is a blue colour fungus on sausages. The fungus creates this condition is,
- (1) Aspergillus Spp.
  - (2) Saccharomyces Spp.
  - (3) Mucor Spp.
  - (4) Penicillium Spp.
  - (5) Agaricus Spp.
20. The correct statement is,
- (1) *Aspergillus flavus* fungus produces Aflatoxine toxic compound.
  - (2) *Clostridium botulinum* occurs soft spoiling.
  - (3) *Erwinia carotovora* changes the colour inside an egg into black or green.
  - (4) *Pseudomonas fluorescens* multiplies on food and produces nerve toxins.
  - (5) *Salmonella paratyphi* creates Cholera diseases.
21. One of the main disadvantage of blanching was chlorosis. The chemical compound that can be used to overcome this situation is,
- (1) Sodium Chloride.
  - (2) Sodium bicarbonate.
  - (3) Sodium nitrate.
  - (4) Calcium chloride.
  - (5) Monosodium glutamate.

***(A/L) Agricultural Science - Multiple Choice Questions and Answers***

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22. In a fruit and a vegetable factory cut fruit and vegetables dip in 100<sup>0</sup>C water for few minutes as a pre treatment. From this treatment they expect to,
- (1) destroy all microbial spores.
  - (2) weaken the function of microbial disease agents.
  - (3) deactivate enzymes that lead to browning of fruits and vegetables.
  - (4) wash off the colluvial in fruits and vegetables.
  - (5) partly cook vegetables and fruits before drying it.
23. When vegetables and fruits are preserved by osmotic dehydration,
- (1) microbial activities are controlled since the water content is less.
  - (2) microbial activities are controlled since the required air is not available.
  - (3) microbes are controlled since they do not get a suitable medium for their survival.
  - (4) microbes are controlled since they do not get required temperature for their growth and function.
  - (5) microbial activities are controlled by changing the pH range.
24. The correct statement on pasteurized food is,
- (1) natural condition of the food is mostly changed.
  - (2) it can be preserved for about one year by storing it in a refrigerator .
  - (3) microbial population which spoils the food will be decreased.
  - (4) that food will not contain any microbe or any microbial spore.
  - (5) water content in the food will decrease.
25. The method that can be used to destroy all microbes and microbial spores for preserving the food for a long period is,
- (1) high temperature Short term method.
  - (2) low temperature long term method.
  - (3) ultra high heat method.
  - (4) blanching.
  - (5) tinning.
26. Food can be preserved first by exposing it to deep freezing and removing water mechanically by sublimation. Then the water in it converts from the solid to gaseous stage. This preserving method is named as,
- (1) freezing.
  - (2) deep freezing.
  - (3) freeze drying.
  - (4) spray drying.
  - (5) dehydration.
27. Lot of problems are arising in the recent times in Sri Lanka as a result of diversified food items. The health issue that arises as a result of food diversification is,
- (1) adding other materials to increase the quantity of spices.
  - (2) increasing vitamin A and D in milk powder .
  - (3) producing rice flour bread instead of wheat flour bread.
  - (4) producing Garcinia cream instead of dried garcinia.
  - (5) preparing Jam, cordial from fruits.
28. The substance which is not considered as food additive is,
- (1) colouring.
  - (2) condenser .
  - (3) yeast extract.
  - (4) antioxidants.
  - (5) emulsifier .

***(A/L) Agricultural Science - Multiple Choice Questions and Answers***

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29. The food items that is picketed by vacuum packaging method are,  
(1) dates and fruits. (2) greenpeas and cashew.  
(3) toffee and fruit juice. (4) milk powder and cut fruit.  
(5) meat balls and margarine.
30. Life amines are,  
(1) amino acids. (2) proteins. (3) carbohydrates.  
(4) vitamins. (5) minerals.
31. Elements of Carbohydrate are,  
(1) Carbon, Oxygen and Hydrogen. (2) Carbon, hydrogen and Nitrogen.  
(3) Carbon, Nitrogen and Oxygen. (4) Carbon, Hydrogen and Sulfur .  
(5) Carbon, Nitrogen and Sulphur .
32. Mono sodium glutamate is,  
(1) an antioxidant. (2) flavouring agent. (3) food preservative.  
(4) flavor . (5) flavor enhancer .
33. A chemical reaction is shown below.  
Polyphenol compounds + oxygen  $\longrightarrow$  Benzoquinone
- This reaction is,  
(1) rancidity. (2) fermentation. (3) caramalization.  
(4) maillard reaction. (5) enzymatic browning.
34. Glucose, Fructose and Galactose are categorized as,  
(1) disaccharides.  
(2) polysaccharides.  
(3) monosaccharides.  
(4) monosaccharides and polysaccharides.  
(5) monosaccharides, disaccharides and polysaccharides.
35. Bacterial growth in food is a reason for food poisoning. Required conditions for bacterial growth in a food are, moisture, air, time, environment.  
(1) low temperature and less acidic environment.  
(2) high temperature and less acidic environment.  
(3) warm temperature and less acidic environment.  
(4) warm temperature and high acidic environment.  
(5) high temperature and high acidic environment.
36. Water soluble polysaccharide is,  
(1) glucose. (2) inulin. (3) starch.  
(4) sucrose. (5) glycogen.

***(A/L) Agricultural Science - Multiple Choice Questions and Answers***

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37. When aseptic packing is done,
- (1) food products are packed, sealed and disinfected.
  - (2) remove air in the food package and vacuum is created.
  - (3) remove air in the food package and Carbon dioxide is filled.
  - (4) the air in the food package is removed and nitrogen is introduced in its place.
  - (5) the food is sterilized and packed in sterilized packages.

38. Functions of minerals in human body is stated below
- A – Maintain water balance in the body  
B – Controls osmotic pressure  
C – Growth and maintenance of teeth and bones

From the above functions, the function/s of sodium is related to,

- (1) A only.
  - (2) B only.
  - (3) A and B only.
  - (4) A and C only.
  - (5) B and C only.
39. Water soluble vitamin is,
- (1) Ergocalciferol.
  - (2) Biotin.
  - (3) Tocopherol.
  - (4) Riboflavin.
  - (5) Naphthoquinone.
40. A person has a very high BMI. He must be suffering from,
- (1) high blood pressure.
  - (2) diabetic.
  - (3) obesity.
  - (4) high cholesterol levels.
  - (5) enjoying good health.

41. A few statements on the importance of adding fibre to the meal is given below.
- A – Fibre increases mineral absorption  
B – It helps to generate energy in the body  
C – reduces constipation

The correct statements from the above are,

- (1) A only.
  - (2) C only.
  - (3) A and B only.
  - (4) A and C only.
  - (5) B and C only.
42. If weight and height of a person are 70kg and 150cm respectively, his BMI is,
- (1) 26
  - (2) 28
  - (3) 30
  - (4) 31
  - (5) 32
43. Enzymic browning occurs
- (1) when heat waves are applied on bread.
  - (2) in too much ripening of a banana.
  - (3) when a piece of ripened banana is dipped in a sugar syrup.
  - (4) When a piece of potato is kept on a plate.
  - (5) when a piece of mango is dipped in an acid solution.

***(A/L) Agricultural Science - Multiple Choice Questions and Answers***

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44. The non-essential amino acid is,  
(1) Valin. (2) Histidine. (3) Licine.  
(4) Threonine. (5) Tyrosine.
45. Thrombosis means, an issue,  
(1) related to food poisoning.  
(2) arises as a result of consuming food with too many preservatives.  
(3) arises as a result of consuming food with high fat contents.  
(4) arises as a result of consuming food with high iron content.  
(5) arises as a result of consuming food with more fibre.
- Different food preservative methods are mentioned below. Answer questions 47 and 48 using them.  
A - Freezing  
B - Disinfection  
C - Blanching  
D - Tindering  
E - Standardization
46. The preservative method that can be used to maintain the nature of vegetables without changing are  
(1) A and C only. (2) A and D only. (3) C and D only.  
(4) A, C and D only. (5) B, C and D only.
47. Symbol in the figure is used to represent one of the above preservation method is,  
(1) A  
(2) B  
(3) C  
(4) D  
(5) E
- 
- H O
48.  $R - \overset{H}{\underset{N H_2}{C}} - C - OH$  structural equation shows  
(1) Hormone (2) Protein (3) Fatty acid  
(4) Amino acid (5) Lipoprotein
49. Causes for getting infected from Pellagra disease is,  
(1) Deficiency in pyridoxine (2) Deficiency in Thiamine  
(3) deficiency in riboflavin (4) deficiency in Niacine  
(5) deficiency in Pantothenic

***(A/L) Agricultural Science - Multiple Choice Questions and Answers***

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50. The constant temperature range in high temperature short term method that is used for milk pasteurization is,
- (1) 15 seconds at 65<sup>0</sup>C
  - (2) 15 seconds at 70<sup>0</sup>C
  - (3) 15 seconds at 72<sup>0</sup>C
  - (4) 15 minutes at 70<sup>0</sup>C
  - (5) 15 minutes at 72<sup>0</sup>C

## 16. Eco Friendly Agriculture

- Water pollution is directly affected by,
  - greenhouse effect.
  - eutrophication.
  - chena cultivation.
  - dryland farming.
  - flood irrigation.
- Out of the following farming methods suitable farming method for a slopy lands is,
  - chena cultivation.
  - crop rotation cultivation.
  - animal crop rotation.
  - integrated farming.
  - conservation farming.
- In Chena cultivation, deforestation starts in,
  - month of March.
  - month of May.
  - month of July.
  - month of September.
  - month of October.
- Crops commonly cultivate in chena cultivation is,
  - Ginger, Meneri, Greengram and Cowpea.
  - Potato, Leaks, Greengram and Undu.
  - Pumpkin, bitter guard, paddy and brinjal.
  - Brinjal, Chillies, Coriander and Beetroot.
  - Raddhish, longbeans, paddy and red onion.
- Few crops are given below.  
A – Less water required crops  
B – Perennial crops  
C – rapidly growing crops  
D – Crops with fibrous root systems  
From above crops suitable crops for dry land farming is,
  - A and B only.
  - A and C only.
  - A and D only.
  - B and C only.
  - C and D only.
- Few statements related to integrated farming is given below.  
A – Few industries are in the same field  
B – by product of an industry uses as a raw material for another industry  
C – Few industries are in the same field but there are no inter relationships  
D – Operates with the aim of energy production  
The correct statements from the above are,
  - A and B only.
  - A and C only.
  - A and D only.
  - B and C only.
  - C and D only.

**(A/L) Agricultural Science - Multiple Choice Questions and Answers**

7. The main greenhouse gas emitted to the atmosphere from paddy fields is,  
 (1) methane. (2) nitrous oxide. (3) ozone.  
 (4) carbon dioxide. (5) sulphate aerosol.
8. In the conservation farming, the attention pays mainly to conserve,  
 (1) water, soil and environment.  
 (2) water, bio-diversity and forests.  
 (3) water, bio-diversity and soil.  
 (4) soil, bio-diversity and forest.  
 (5) water, environment and cultural values.
9. A few statement on intercropping is given below.  
 A – Main crop is an economically valuable plantation crop whereas intercrop is a compulsory fruit crop  
 B – Risk and uncertainty is less  
 C – Difficult in weed control, fertilizer application and mechanization  
 D – Crop management is difficult
- The correct statements from above are,  
 (1) A and B only. (2) A and C only. (3) A and D only.  
 (4) B and C only. (5) C and D only.
10. The table given below indicates the different environment issues, the reasons and the effects prepared by a student

Environment issue	Causing gas	Effect
A Acid rains	$N_2O, NO_3^-$	Soil degradation
B Increase in installation of Ultraviolet rays	CFC	Decrease in crop harvest
C Global warming	$H_2O_{(g)}$	Change in distribution of vegetation
D Depletion of ozone layer	$CH_4$	Cataract

The correct combination from the above is /are

- (1) A only (2) A and D only (3) A, B and C only  
 (4) A, B and D only (5) A, C and D only

11.



A



B

**(A/L) Agricultural Science - Multiple Choice Questions and Answers**

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Diagrams A and B respectively shows,

- (1) mixed crop cultivation and intermittent crop cultivation.
- (2) intercropping and mixed cropping.
- (3) street crop cultivation and mixed crop cultivation.
- (4) intermittent crop cultivation and multi-layer crop cultivation.
- (5) multi-layer crop cultivation and intercropping.

12



The tree marked as P can be,

- (1) Jack, Mahogani and Teak.
- (2) Mee, Domba and Godapara.
- (3) Ipil Ipil, gliricedia and Kathunmununga.
- (4) Rambutan, Bread fruit and Banana.
- (5) Oranges, Narang and butterfruit.

13. A few statements on intercropping method is given below.

- A - The crops cultivate here should be friendly crops.
- B - When one crop is flowered other crop should be cultivated.
- C - Annual or peremial crops should be cultivated in the field.
- D - When selecting crops height should be considered.

The correct statement from the above are,

- (1) A and B only.
- (2) A and C only.
- (3) A and D only.
- (4) B and C only.
- (5) C and D only.

14. The best answer that combine main crop and inter crop in intercropping is

Main crop	Inter crop
(1) Coconut	Palmyrah and yams
(2) Papaya	Mango and Rambutan
(3) Guava	Batoko plum (Lovi) and banana
(4) Rubber	Beetle and coffee
(5) Rambutan	Durian and yams

**(A/L) Agricultural Science - Multiple Choice Questions and Answers**

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15. The statements on the importance of crop rotation are given below.

- A - Nutrient balance is protected
- B - Cost for pest control is minimum
- C - Soil physical properties will improve
- D - Risk and uncertainty will increase

The correct combination from the above statements are,

- (1) A and B only                      (2) A, B and C only                      (3) A and D only
- (4) B and C only                      (5) C and D only

16. A few statements on alley cropping are given below.

- A - Cultivates in steep areas in low country wet zone.
- B - Cultivates legumes as a live fence with short spacing.
- C - Removed plant parts are used as a fuel and mulch.

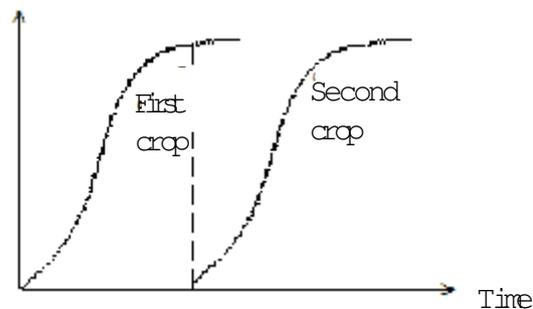
The correct combination from above statements is/ are,

- (1) A only.                              (2) B only.                              (3) A and B only.
- (4) A and C only.                      (5) B and C only.

17. Least contributor for water pollution in Sri Lanka is,

- (1) soil erosion.                              (2) Intense fertilizer usage.
- (3) disposal of faeces.                              (4) Intense usage of pesticides.
- (5) releasing warm waste.

18. Crop growth



The crop cultivation pattern shows in the above graph is,

- (1) intercropping.                              (2) intermittent cropping.
- (3) mixed cropping.                              (4) street crop cultivation.
- (5) multi-layer crop cultivation.

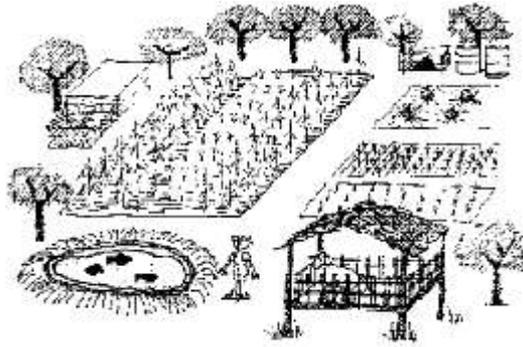
19. A farmer prepared a cropping plan for his home garden for four seasons. The correct crop sequence can be used is,

- (1) Maize → Ladies fingers → Kathurumurunga → Radhish
- (2) Finger millet → Long beans → Imala → Brinjal
- (3) Imala → Beans → Cabbage → Groundnut
- (4) Imala → Beans → Cabbage → Groundnut
- (5) Brinjal → maranthus → Green gram → iri ala

***(A/L) Agricultural Science - Multiple Choice Questions and Answers***

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20. To get the maximum benefit from intermittent crop cultivation, successively grown two vegetables are,
- (1) Ginger → Long beans.                      (2) Bitter guard → Beans  
(3) Carrot → Sweet potato                      (4) Chillie → Snake guard  
(5) Cabbage → Red onion
21. Farming method that uses water efficiently and practiced in areas where rainfall is 50.8cm is
- (1) chena cultivation.                      (2) dryland farming.  
(3) integrated farming.                      (4) conservation farming.  
(5) crop rotation.
22. Causal agent of 'Marble Cancer' disease is,
- (1) bacteria.                      (2) virus.                      (3) acid rains.  
(4) base rains.                      (5) round worm.
- 23.



- Above diagram shows,
- (1) mixed crop cultivation.                      (2) integrated crop cultivation.  
(3) agro-forestry system.                      (4) a method of Animal husbandry.  
(5) multi-layer crop cultivation.
24. A few processes followed in a certain farming method is given below.
- A - Zero or minimal land preparation in areas where risk of erosion exists  
B - Organic mulching  
C - Put stubble to the field  
D - Application of integrated pest control methods
- This farming method is,
- (1) chena cultivation.                      (2) dryland farming method.  
(3) integrated farming method.                      (4) conservation farming method.  
(5) crop rotation method.
25. Agro-forestry means in one field,
- (1) growing forest trees.  
(2) cultivating forest trees and agriculture crops and rearing farm animals.  
(3) cultivating perennial and annual crops and rearing animals.  
(4) cultivating more than two crop keeping proper spacing.  
(5) growing forest trees.

***(A/L) Agricultural Science - Multiple Choice Questions and Answers***

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26. Agriculture method practiced to conserve soil under conservation farming is,  
(1) rubble ridges.           (2) cutting drains.       (3) terracing.  
(4) soil ridges.           (5) mulching.
27. Out of following, a bio-diversity conservation method is,  
(1) rubble ridge.  
(2) adding stubble to the field.  
(3) applying SALT method.  
(4) cutting drains.  
(5) land preparation.
28. A farmer grew following crops from the fence of the field to the land.  
Jack → Coconut<sup>p</sup> → Cardomom → Coffee → Papaya → Maize → Green leaves  
This cropping system is,  
(1) chena cultivation.           (2) integrated farming.  
(3) street cropping.           (4) multi-layer cropping.  
(5) crop rotation.
29. The correct statement on chena cultivation is,  
(1) in chena cultivation, crops are grown at one location in one season.  
(2) Chena has to be started close to a tank since farming is done with water taken from the tank.  
(3) chena cultivations are commonly in wet zone.  
(4) primary land preparation is done and the secondary land preparation is done only between rows.  
(5) organic fertilizer is not commonly applied to the crops.
30. Disadvantage of chena cultivation is,  
(1) the cost of inorganic fertilizer application.  
(2) huge labour requirement for land preparation.  
(3) application of chemical methods to control weeds.  
(4) soil nutrients converts to gases and release from the soil.  
(5) risk and uncertainty is high since it is a mono-crop cultivation.
31. Adverse environmental conditions can arise as a result of improper land preparation. An example for that is,  
(1) minimum land preparation in sloppy lands.  
(2) ploughing during high intense rainy periods.  
(3) using Japanese convertible plough for ploughing in small paddy fields.  
(4) change the depth of land preparation according to the crop.  
(5) zero land preparation in steep lands.

***(A/L) Agricultural Science - Multiple Choice Questions and Answers***

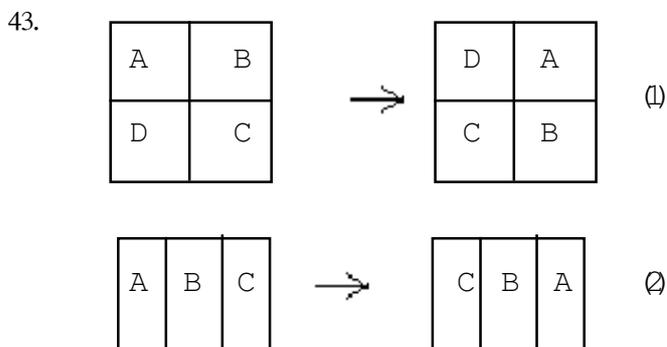
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32. A severe unfavourable environmental effect due to the agriculture waste is,  
(1) air pollution.  
(2) adding impurities to the ground water.  
(3) usage of agriculture waste dumped lands for crop cultivation.  
(4) changing of food patterns in animals.  
(5) emergence of resistant pest varieties due to adaptation.
33. The highest contributing factor for world's water pollution is,  
(1) agricultural activities.           (2) hydropower generation.  
(3) factories.                           (4) urbanization.  
(5) household consumption.
34. The percentage of water available 1/2km below the surface of the earth is,  
(1) 0.11%       (2) 0.32%       (3) 0.65%       (4) 2%       (5) 48.8%
35. A few statement given below are identified by a student as benefits of forests.  
A - Maintain O<sub>2</sub>/CO<sub>2</sub> balance  
B - Control of temperature and moisture of the atmosphere on the earth surface and reflection of solar radiation  
C - Maintain bio-diversity of the earth  
D - Ability to absorb chemicals that leads to deplete ozone layer  
The correct statements from the above statements are,  
(1) A and B only.       (2) A and C only.       (3) A, B and C only.  
(4) A, C and D only.       (5) B, C and D only.
36. According to a few statements of a student the action has to be taken to minimize adverse effects of pesticides to the environment and human beings are given below.  
A - Mark colour strips in packages  
B - Impose laws to remove poisonous pesticides  
C - Create public awareness on natural pesticides  
D - Make pesticides so that water solubility is minimal  
The correct statements from the above statements are,  
(1) A and B only.       (2) A and C only.       (3) A and D only.  
(4) A, B and C only.       (5) B, C and D only.
37. A negative effect of ozone layer depletion is the,  
(1) increase in average temperature of the earth.  
(2) decrease in O<sub>2</sub> concentration in the atmosphere.  
(3) increase in Ultra violet insolation.  
(4) sea level rise due to melting of ice sheets in polar regions.  
(5) decrease in fish harvest.
38. Reason for acid rain is,  
(1) Methane and Ozone gases.                           (2) Methane and Nitrous oxide gases.  
(3) Methane and Sulphur dioxide gases.       (4) Carbon dioxide and sulphur dioxide.  
(5) Nitrogen dioxide and Sulphur dioxide.

**(A/L) Agricultural Science - Multiple Choice Questions and Answers**

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39. Legume is grown after a grain in crop rotation. Reason for that is, its
- (1) translocating nutrients.
  - (2) improving soil texture.
  - (3) improving soil structure.
  - (4) phosphorous deficiency in soil.
  - (5) large area of the surface soil is covered .
40. Inter crops in coconut cultivations are established when age of the coconut cultivation is less than,
- (1) 15 years and more than 30 years.
  - (2) 2 years and more than 20 years.
  - (3) 5 years and more than 25 years.
  - (4) 3 years and more than 30 years.
  - (5) 1 year and more than 15 years.
41. Vegetable crops and pulses are selected in intercropping. The requirements fulfilled by these crops are respectively are,
- (1) loosening the soil at harvest and fixing atmospheric nitrogen.
  - (2) absorbing nutrients from deeper soil layers and fixing nitrogen.
  - (3) absorbing more nitrogen from the soil and loosening soil during harvesting.
  - (4) fixing atmospheric nitrogen and loosening soil.
  - (5) absorbing more nitrogen and fixing atmospheric nitrogen.
42. A method used in crop establishment in chena cultivation is,
- (1) planting in rectangular method.
  - (2) sowing seeds.
  - (3) planting seeds.
  - (4) planting by machines.
  - (5) planting in triangular method.

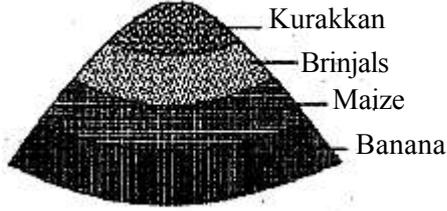


The above (1) and (2) crop rotating methods are identified respectively as,

- (1) di crop rotation and tri crop rotation.
  - (2) tri crop rotation and tetra crop rotation.
  - (3) tetra crop rotation and tri crop rotation.
  - (4) tri crop rotation and di crop rotation.
  - (5) tetra crop rotation and di crop rotation.
44. An advantage of chena cultivation is,
- (1) no need proper land preparation.
  - (2) no need fertilizer application.
  - (3) no need soil conservation practices.
  - (4) fulfill social and nutritional needs.
  - (5) use only rain water .

**(A/L) Agricultural Science - Multiple Choice Questions and Answers**

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45. Kanyan home gardening includes in the cultivation called,
- (1) crop rotation.                      (2) multi layer crop system.  
(3) relay cropping system.            (4) integrated farming.  
(5) alley cropping system.
46. A farmer practiced rearing animals and crop cultivation in his farm and producing bio gas using animal faeces and crops wastes. This farming method is,
- (1) crop rotation.                      (2) mixed crop cultivation.  
(3) conservation farming.            (4) dryland farming.  
(5) integrated farming.
47. Cover crops are grown in plantation crop cultivations such as Coconut and Rubber . Main expectation of this is,
- (1) soil conservation, conserving soil moisture and improve soil fertility.  
(2) soil conservation, improve soil fertility and to earn additional income.  
(3) conserve soil moisture, Improve soil fertility and earn an additional income.  
(4) control unfavourable microbes in soil, improve soil aeration and prevent soil erosion.  
(5) conserve soil nutrients, Improve soil microbial activity and earn an additional income.
48. A few statements related to environment pollution are given below.
- A – Unlimited application of agro-chemicals is the main reason for environmental pollution  
B – Environmental pollution can be minimized through organic farming  
C – Environmental pollution can significantly be prevented by integrated farming  
D – Usage of agro-chemicals can be minimized by cultivating high yielding crop varieties produced from breeding methods and environmental pollution can be reduced.
- The correct statements from the above statements are,
- (1) A and B only.            (2) A and C only.            (3) B and C only.  
(4) C and D only.            (5) B, C and D only.
49. The figure shows an agronomic practice used for soil conservation. It is,
- (1) crop rotation method.  
(2) mixed crop cultivation.  
(3) intermittent cultivation.  
(4) strip cultivation.  
(5) intercropping cultivation.
- 
50. Increase in carbon dioxide percent age and increase in atmospheric temperature are currently existing environmental issues. A very effective agricultural activity to minimize this condition is,
- (1) minimize usage of agrochemicals.  
(2) follow crop rotational agriculture methods.  
(3) grow forests.  
(4) prevent soil erosion.  
(5) cultivate crops in the green houses.

## 17. Agricultural Economics

1. According to the theory of diminishing of marginal utility, if a certain good is consumed which one of the followings thoroughly explains, increases of consumption and its effect to the utility is
  - (1) decreases the total utility .
  - (2) total utility becomes negative value.
  - (3) both marginal utility and total utility decrease.
  - (4) while marginal utility decreases total utility increases.
  - (5) both marginal utility and total utility increase.
  
2. The impact on marginal utility if the combination of goods which maximize the total utility out of all the good combination that a consumer can consume,
  - (1) maximizes the marginal utility per unit price of each good.
  - (2) maximizes the marginal utility per unit price of any good.
  - (3) marginal utility is the same for unit price of all goods.
  - (4) marginal utility is the same for any unit price of any good.
  - (5) marginal utility increases only for some goods while marginal utility keeps constant for the rest of goods.
  
- Use the following demand and supply function to answer the questions 3 and 4
$$Q_s = 1000 + p$$
$$Q_d = 2000 - p$$
  
3. The equilibrium price is,
  - (1) Rs 100.                      (2) Rs. 500.                      (3) Rs. 1 000
  - (4) Rs. 1 250.                      (5) Rs. 1 500
  
4. At the equilibrium level, the amount which the supplier can supply to the market is,
  - (1) 500kg.                      (2) 1 000kg.                      (3) 1 800kg.
  - (4) 2 000kg.                      (5) 2 250kg.
  
5. A few statements on iso- quant curves are given below.
  - A - All the alternatives of 2 inputs combinations produce 2 inputs unique product levels.
  - B - All the alternatives of two products produce totally and optimally utilizing input combinations.
  - C - When all the alternatives of two goods are combined, the producer becomes indifferent by obtaining the same profits from those two goods.

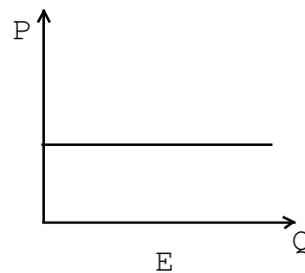
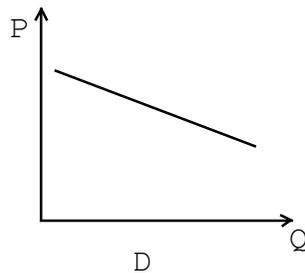
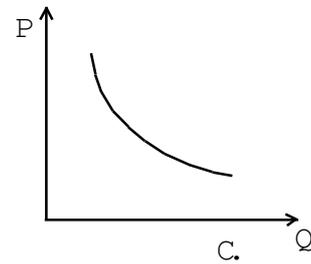
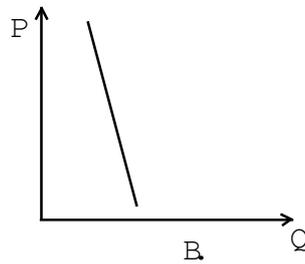
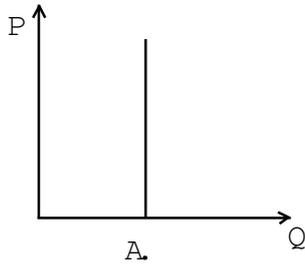
The correct statement/s from the above statements is/are,

  - (1) A only.                      (2) B only.                      (3) A and B only.
  - (4) A and C only.                      (5) B and C only.

***(A/L) Agricultural Science - Multiple Choice Questions and Answers***

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- The graphs given below are five different demand curves. Answer the question 6 and 7 based on them.

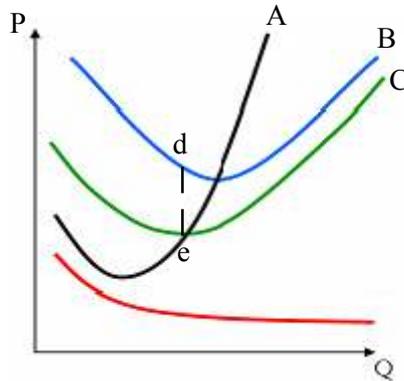


6. The curve which shows elastic demand of elasticity is,  
(1) A.      (2) B.      (3) C.      (4) D.      (5) E.
7. The good shows demand as per graph B is,  
(1) mobile phone      (2) rice      (3) salt  
(4) medicine      (5) ice cream
8. The marginal rate of substitution is,  
(1) the quantity which needs to be added one input in order to reduce the quantity from another input with a small amount without affecting to the total output.  
(2) the rate that the producer can exchange by adding small amount from an input into a small amount of another input without affecting the total value of the inputs.  
(3) the rate that the producer can exchange by adding small amount from an input into a small amount of another input without affecting the total quantity of input.  
(4) the rate of easiness or difficulty of production technology by substituting one into another production technology.  
(5) the quantity of inputs that can be changed by making a complete change in the production technology.
9. The social responsibility of a business is,  
(1) honesty in business activities.  
(2) welcome the customers.  
(3) help the customers.  
(4) fulfill the customers' needs as soon as possible.  
(5) carryout business activities with least damage to the environment.

**(A/L) Agricultural Science - Multiple Choice Questions and Answers**

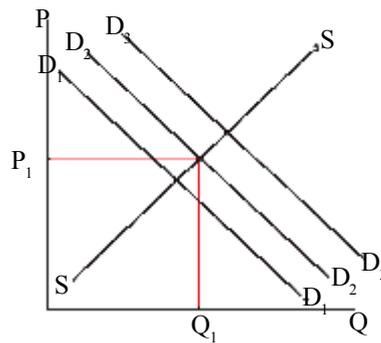
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10. The tangent point of iso-quant curves and iso - cost curves is,
- (1) different input combinations with least cost show different output level.
  - (2) different levels of output can be produced by using given level of inputs.
  - (3) the level of different input combinations needed in order to produce given level of output.
  - (4) least cost input combination needed in order to produce considered level of output.
  - (5) the point where maximum usage of technology of the production process.
11. The slope of the total variable cost curve is equal to the,
- (1) average variable cost.
  - (2) average gross cost.
  - (3) marginal cost.
  - (4) marginal production.
  - (5) average production.
- Use the following diagram to answer question number 12 and 13.



12. C is denoted by the,
- (1) marginal cost.
  - (2) average variable cost.
  - (3) average fixed cost.
  - (4) average total cost.
  - (5) total variable cost.
13. The vertical distance between B and C at any level of production is the,
- (1) marginal cost.
  - (2) average variable cost.
  - (3) average total cost.
  - (4) average fixed cost.
  - (5) total variable cost.
14. The three main categories of resources in a farm are,
- (1) labor, crops and land.
  - (2) land, labor and capital.
  - (3) money, labor and animals.
  - (4) buildings, animals and crops.
  - (5) money, land and animals.
15. If the total cost is Rs 245 000.00 and variable cost is Rs 40 000.00, the fixed cost is,
- (1) Rs. 205 000.
  - (2) Rs. 215 000.
  - (3) Rs. 240 000.
  - (4) Rs. 265 000.
  - (5) Rs. 285 000.

16.



According to the above diagram,

- (1) both equilibrium price and quantity increase due to shift of demand curve to right side.
- (2) equilibrium price increases due to shift of demand curve into right side.
- (3) equilibrium price decreases and demand increases due to shift of demand curve into left side.
- (4) demanded quantity changes while supply does not change due to shift of demand curve into left side.
- (5) increase the equilibrium price while no change in the quantity demanded due to shift of demand curve into right side.

17. The basic characteristic of an oligopoly market is,

- (1) a few sellers & one buyer.
- (2) a few sellers & many buyers.
- (3) a few sellers & few buyers.
- (4) many sellers & few buyers.
- (5) many sellers & many buyers.

18. When the average cost of a good is increased, the marginal cost,

- (1) becomes much higher value than average cost.
- (2) becomes much lower value than average cost.
- (3) equals to average cost.
- (4) becomes much higher value than average variable cost.
- (5) becomes much lower value than average variable cost.

19. An example for the regional specialization of labour is,

- (1) tea plucking methods in Deniyaya area.
- (2) soil conservation methods practiced by the farmers in W elimada.
- (3) reading newspapers.
- (4) usage of agricultural equipments by farmers in Anuradhapura.
- (5) production of cane item in W ewaldeniya area.

20. A few statements on a factor of production are given below.

- A. Limited resource with contribution to production process.
- B. Although it cannot be increased, it can be developed.
- C. Physically immobile.

The factor/s of production is/are the,

- (1) capital.
- (2) labour.
- (3) land.
- (4) land and the labour.
- (5) land and the capital.

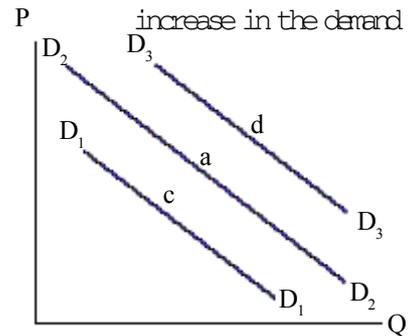


**(A/L) Agricultural Science - Multiple Choice Questions and Answers**

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27. The point in the given graph which shows the increase in the demand of chicken is from,

- (1) a to b.
- (2) a to c.
- (3) a to d.
- (4) a to e.
- (5) b to a.



28. When the demand of a good decrease while the supply keep unchanged, the equilibrium price,

- (1) decreasing equilibrium quantity while increases.
- (2) increasing equilibrium quantity while increases.
- (3) decreasing equilibrium quantity while decreases.
- (4) increasing equilibrium quantity while decreases.
- (5) increasing equilibrium quantity while un-changes.

29. When the total production increases, the marginal production,

- (1) and average production becomes zero.
- (2) is positive and average production becomes zero.
- (3) becomes a zero while average production is positive.
- (4) and average production become positive.
- (5) becomes negative while average production is zero.

30. When the percentage changes in quantity demand is equal to the percentage change in a particular price of a good, the elasticity is,

- (1) perfectly inelastic.
- (2) lower than one.
- (3) equal to one.
- (4) higher than one.
- (5) perfectly Elastic.

31. The marginal cost is calculated in producing a particular good by,

- (1) dividing the total cost by quantity produced.
- (2) dividing the fixed cost by quantity produced.
- (3) dividing the total variable cost by quantity produced.
- (4) dividing the difference of total cost by the difference of the quantity produced.
- (5) subtracting fixed cost by total cost.

32. A few characteristics of a market are given below.

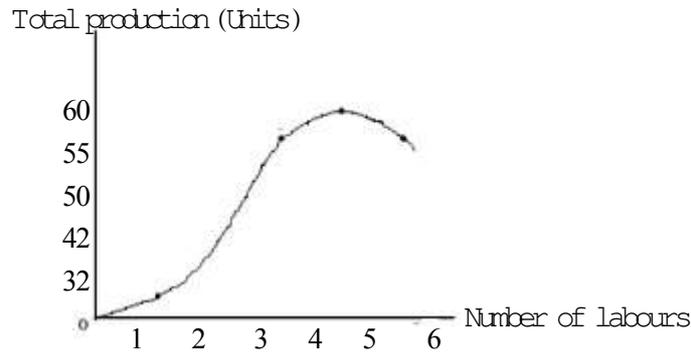
- Many buyers and sellers
- Goods are identical
- No restriction in entering and exiting the market

The market existing with above characteristics is,

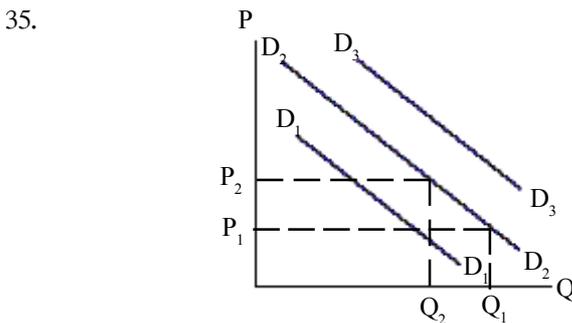
- (1) perfect competitive market.
- (2) monopolistic market.
- (3) monopolistic competitive market.
- (4) oligopoly market.
- (5) oligopolistic competitive market.

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- Answer the question 33 and 34 by using the following graph



33. The average production in the level of 3<sup>rd</sup> labour is,  
 (1) 10 units.                      (2) 14 units.                      (3) 30 units.  
 (4) 50 units.                      (5) 120 units.
34. The marginal production for the 6<sup>th</sup> labour is,  
 (1) -50      (2) -5      (3) 5      (4) 8      (5) 10



According to the graph, once the price increases from P<sub>1</sub> to P<sub>2</sub>,

- (1) demand curve shifts from D<sub>1</sub> to D<sub>2</sub>.
  - (2) quantity demand decreases from Q<sub>1</sub> to Q<sub>3</sub>.
  - (3) quantity demand decreases from Q<sub>1</sub> to Q<sub>2</sub>.
  - (4) demand curve shifts from D<sub>2</sub> to D<sub>1</sub>.
  - (5) demand curve keeps constant at D<sub>2</sub>.
36. The following table shows some information on usage of urea in papaya cultivation. Market price of papaya (kg) is Rs 80.00. Market price of urea (kg) is Rs. 30.00

Production Level	Land (ha)	Urea (kg)	Papaya production (kg)
1	1	10	100
2	1	100	210
3	1	150	310
4	1	200	380
5	1	250	430
6	1	300	455
7	1	350	455

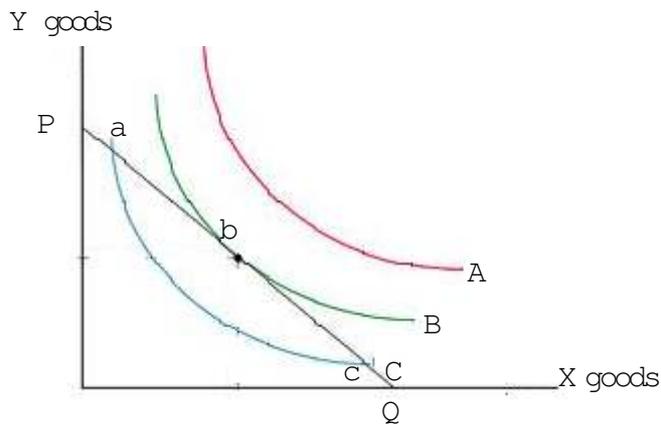
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The amount of urea (kg) which farmer has to apply in order to get the maximum profit is,  
 (1) 100kg.      (2) 150kg.      (3) 200kg.      (4) 250kg.      (5) 300kg.

37. The reason for the incur opportunity cost for the factors of production is,  
 (1) able to use for the production process.  
 (2) have to bear the cost.  
 (3) need to be used effectively.  
 (4) exist of many alternative production.  
 (5) become a limited resource.

- Use the following graph to answer Question 38 and 39.



38. The point which shows the maximum of consumer satisfaction is,  
 (1) a      (2) b      (3) c      (4) P      (5) Q
39. The statements A, B and C on indifference curves are given below.  
 A - The satisfaction of A is higher than the B.  
 B - The level of satisfaction of C is higher than B.  
 C - The level of satisfaction is equal in the any point of a curve.

The correct statement/s from the above statements is/are,

- (1) A only      (2) B only      (3) A and B only  
 (4) A and C only      (5) B and C only.
40. The shifting of demand curve is due to,  
 (1) changes of consumers income level.  
 (2) changes price of particular goods.  
 (3) changes of consumers preference.  
 (4) impacts from climate factors.  
 (5) changes of price of substitute goods.
41.  $Q_d = 200 - 20P_x$  If the price is Rs 2.00, the demand is,  
 (1) 100 units.      (2) 120 units.      (3) 160 units.  
 (4) 200 units.      (5) 400 units.



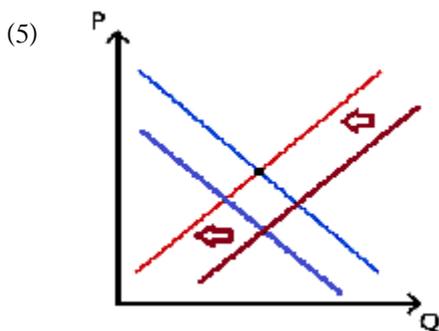
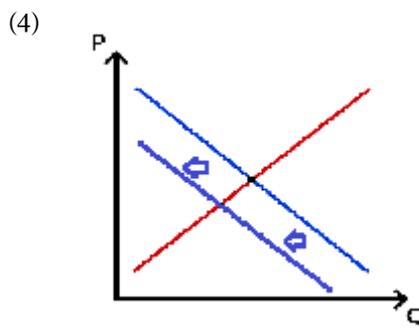
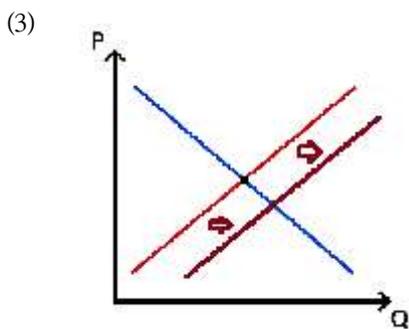
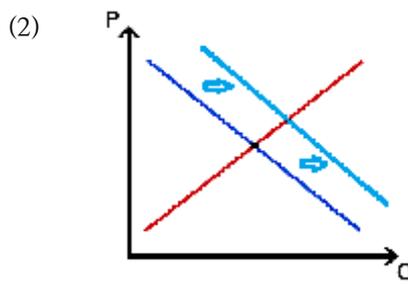
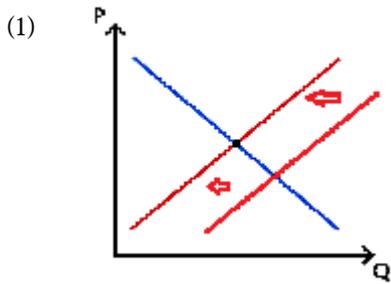
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48. The theory of demand is,

- (1) increasing the demand when the income increases.
- (2) increasing the demand when both income and price increases.
- (3) increasing the demand when the price increases.
- (4) increasing the demand when the price decreases.
- (5) decreasing the demand when the price decreases.

49. Which graph shows the decreasing of the supply of rice due to drought ?



50. The farm management is the,

- (1) process of continuous decision making while facing to challenges
- (2) function that is done in the seasons while efficiently organizing the production process
- (3) controlling the activities of the farm which would result in lowering the cost.
- (4) Engaging farm production process while effectively and efficiently utilizing, land, labour, capital.
- (5) efficient utilization of input which would result in maximum profits from the farm.

# Multiple Choice Questions - Answers

## 1. Development Agriculture in Sri Lanka

- |         |         |         |         |         |
|---------|---------|---------|---------|---------|
| 1. (3)  | 11. (5) | 21. (4) | 31. (3) | 41. (1) |
| 2. (1)  | 12. (2) | 22. (1) | 32. (4) | 42. (2) |
| 3. (4)  | 13. (4) | 23. (5) | 33. (3) | 43. (4) |
| 4. (2)  | 14. (1) | 24. (3) | 34. (3) | 44. (5) |
| 5. (4)  | 15. (2) | 25. (4) | 35. (1) | 45. (5) |
| 6. (5)  | 16. (1) | 26. (3) | 36. (3) | 46. (3) |
| 7. (4)  | 17. (5) | 27. (3) | 37. (5) | 47. (4) |
| 8. (1)  | 18. (4) | 28. (1) | 38. (3) | 48. (5) |
| 9. (1)  | 19. (1) | 29. (5) | 39. (4) | 49. (4) |
| 10. (5) | 20. (2) | 30. (4) | 40. (5) | 50. (4) |

## 2. Effect of Climate to the Crop Cultivation

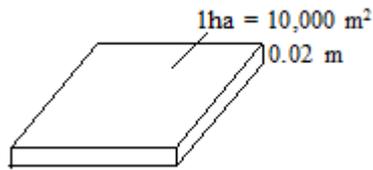
- |         |         |         |         |         |
|---------|---------|---------|---------|---------|
| 1. (5)  | 11. (2) | 21. (1) | 31. (3) | 41. (3) |
| 2. (5)  | 12. (2) | 22. (5) | 32. (3) | 42. (1) |
| 3. (4)  | 13. (3) | 23. (1) | 33. (4) | 43. (4) |
| 4. (2)  | 14. (3) | 24. (2) | 34. (3) | 44. (3) |
| 5. (2)  | 15. (5) | 25. (2) | 35. (2) | 45. (4) |
| 6. (5)  | 16. (5) | 26. (1) | 36. (3) | 46. (3) |
| 7. (1)  | 17. (3) | 27. (5) | 37. (4) | 47. (4) |
| 8. (4)  | 18. (5) | 28. (4) | 38. (3) | 48. (3) |
| 9. (1)  | 19. (3) | 29. (4) | 39. (3) | 49. (3) |
| 10. (2) | 20. (4) | 30. (2) | 40. (3) | 50. (4) |

3 According to the given data, strong wind and continuous heavy rainfall occur during the month of December. Hence, this is a cyclonic condition emerged due to low atmospheric pressure. Since it is an instance of the cyclonic weather system, the answer is (4).

14 For an atmospheric weather system to transform into a cyclone, the Coriolis Power should not be closer to zero. The place where the observation was done. A cyclone does not develop therefore as the Coriolis Power is closer to zero. Hence, statements A and B are correct.

31 When the table is used to find out the relative humidity, the difference between the readings of the dry and wet bulbs should be calculated. Then, the Relative Humidity can be obtained. (Find a copy of the table and find the row which has the dry bulb reading as 28°C. Then, shade the column showing the difference as 2.0 and point out the exact value.)

$$\begin{aligned} 33 \quad \text{Area of the land} &= 1 \text{ ha} = 10,000 \text{ m}^2 \\ \text{Height of water received from rainfall} &= 20 \text{ mm} = \frac{20}{1000} \text{ m} \end{aligned}$$



So, the volume of water obtained =  $0.02 \times 10,000 = 200 \text{ m}^3$

34 The diameter of the funnel of the raingauge = 12 cm

The radius of the funnel of the raingauge =  $\frac{12}{2} = 6 \text{ cm}$

The area of the opening of the funnel =  $\pi r^2$   
=  $\frac{7}{22} \times 6 \times 6$

The volume of water obtained =  $\pi r^2 h$   
72 =  $\frac{7}{22} \times 6 \times 6 \times h$

0.63 cm = h  
h = 6.3 mm

Amount of rainfall = 6.3 mm

35 The volume of water collected by the raingauge =  $10 \text{ cm}^3$

Diameter of the funnel of the raingauge = 12.7 cm

Radioud of the funnel of the raingauge = 6.35 cm

Finding the rainfall

$\pi r^2 h = 18 \text{ cm}^3$

$h = \frac{18}{\pi r^2} = \frac{18 \times 7}{22 \times 6.35 \times 6.35}$   
= 0.142 mm

### 3. Effect of Soil Environment to the Crop Cultivation

- |         |         |         |         |         |
|---------|---------|---------|---------|---------|
| 1. (3)  | 11. (2) | 21. (5) | 31. (4) | 41. (4) |
| 2. (3)  | 12. (2) | 22. (4) | 32. (4) | 42. (4) |
| 3. (4)  | 13. (1) | 23. (3) | 33. (1) | 43. (1) |
| 4. (3)  | 14. (2) | 24. (1) | 34. (4) | 44. (2) |
| 5. (1)  | 15. (1) | 25. (4) | 35. (1) | 45. (5) |
| 6. (5)  | 16. (5) | 26. (1) | 36. (5) | 46. (3) |
| 7. (2)  | 17. (3) | 27. (3) | 37. (5) | 47. (2) |
| 8. (4)  | 18. (2) | 28. (1) | 38. (1) | 48. (3) |
| 9. (1)  | 19. (1) | 29. (4) | 39. (2) | 49. (2) |
| 10. (3) | 20. (4) | 30. (2) | 40. (3) | 50. (2) |

$$\text{Soil density} = \frac{\text{Dry weight of soil}}{\text{Total volume}}$$

so

$$\text{Soil density} = 2.65 \text{ gcm}^{-3}$$
$$\text{Dry weight of soil} = 100 \text{ g}$$

$$\text{Volume of soil} = \text{If it is } V_t$$

$$2.65 = \frac{100}{V_t}$$

$$V_t = \frac{100}{2.65}$$
$$= 3.77 \text{ cm}^{-3}$$

14. The percentage of soil base saturation value

$$\text{The total exchangeable cation in the soil} = \text{Amount of Acidic Cation} + \text{Amount of Base Cation}$$

$$\text{The total exchangeable cation in the soil} = \text{The soil exchangeable cation capacity}$$

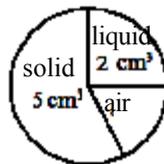
$$\therefore \text{The soil exchangeable cation capacity} = \text{Amount of Acidic Cation} + \text{Amount of Base Cation}$$

$$\text{As per the data a} = \text{b} + \text{base cation quantity}$$

$$\text{base cation quantity} = (\text{a}-\text{b})$$

$$\text{Hence, the percentage of soil base saturation value} = \frac{\text{a}-\text{b}}{\text{a}} \times 100$$

47. When a soil sample is considered, the volume can be shown as below:



$$\text{Total volume} = \text{volume of solid part} + \text{volume of liquid part} + \text{volume of air part}$$

$$8 = 5 + 2 + \text{volume of the air part}$$

$$\therefore \text{volume of air} = 1 \text{ cm}^3$$

The volume of liquid and air constitute the soil porosity

$$\text{so, the porosity} = \frac{\text{volume of liquid and air}}{\text{Total volume}} \times 100$$

$$= \frac{(2+1)}{8} \times 100$$

$$= 37.5\%$$

## 4. Plan Nutrition

- |         |         |         |         |         |
|---------|---------|---------|---------|---------|
| 1. (3)  | 11. (2) | 21. (4) | 31. (3) | 41. (2) |
| 2. (4)  | 12. (5) | 22. (2) | 32. (2) | 42. (1) |
| 3. (5)  | 13. (2) | 23. (3) | 33. (2) | 43. (2) |
| 4. (5)  | 14. (2) | 24. (1) | 34. (1) | 44. (2) |
| 5. (5)  | 15. (3) | 25. (2) | 35. (4) | 45. (3) |
| 6. (4)  | 16. (2) | 26. (4) | 36. (3) | 46. (1) |
| 7. (5)  | 17. (4) | 27. (4) | 37. (3) | 47. (1) |
| 8. (2)  | 18. (1) | 28. (3) | 38. (2) | 48. (4) |
| 9. (1)  | 19. (4) | 29. (4) | 39. (4) | 49. (2) |
| 10. (4) | 20. (3) | 30. (1) | 40. (5) | 50. (1) |

8 The volume of Nitrogen in 1000kg mixture =  $\frac{5}{100} \times 1000$   
= 50 kg  
The volume of Urea in N 46kg = 100 kg  
The volume of Urea in N 50kg =  $\frac{100}{46} \times 50$   
= 108.69 kg

11 The amount of Nitrogen in 100kg Urea = 46 kg  
The amount of Nitrogen in 50kg Urea =  $\frac{46}{100} \times 50$   
= 23 kg

16. The amount of Nitrogen to be added to soil = (72-36) = 36 kg  
Since the fertilizer efficiency of Urea is 50%  
Fertilizer to be added to give 50kg of Urea = 100 kg  
Fertilizer to be added to give (72-36)kg of Urea =  $\frac{100}{50} \times (72 - 36)$  kg

44. The amount of Urea to be added to give 46kg of Nitrogen = 100 kg  
The amount of Urea to be added to give 230kg of Nitrogen =  $\frac{100}{46} \times 230$   
= 500 kg

## 5. Land Preparation

- |         |         |         |         |         |
|---------|---------|---------|---------|---------|
| 1. (1)  | 11. (1) | 21. (4) | 31. (5) | 41. (1) |
| 2. (2)  | 12. (4) | 22. (2) | 32. (3) | 42. (3) |
| 3. (2)  | 13. (4) | 23. (5) | 33. (3) | 43. (1) |
| 4. (5)  | 14. (4) | 24. (1) | 34. (3) | 44. (5) |
| 5. (5)  | 15. (4) | 25. (2) | 35. (3) | 45. (4) |
| 6. (3)  | 16. (2) | 26. (2) | 36. (4) | 46. (4) |
| 7. (4)  | 17. (5) | 27. (3) | 37. (1) | 47. (5) |
| 8. (4)  | 18. (3) | 28. (2) | 38. (3) | 48. (3) |
| 9. (5)  | 19. (1) | 29. (4) | 39. (2) | 49. (5) |
| 10. (3) | 20. (1) | 30. (1) | 40. (3) | 50. (4) |

2. Due to the land preparation, soil texture, true density, colour, cation exchange capacity and pH will not get changed. Visible density and porosity will get changed. Hence, the answer is (2)
6. During the deep tillering, the upper layer of the soil is not disturbed while it loosens the deep soil layer. This is done to grow crop with deep root system. Hence, the answer is (3).
7. Large seeds are grown without preparing planting beds. As tuber crops are also grown on loosen soil, there is no need for the preparation of beds. Hence the answer is (4)
10. During minimum land preparation, the soil gets the minimum loosening. Compared to the maximum land preparation, the soil porosity is lower and thus the microbial activities are also at a lower level, causing the reduction in the formation of root knots. Hence the answer is (3).
24. Through puddling, small weightless seeds are germinated. Hence the answer is (1).
35. Compacted nurseries are used to plant small seeds. Hence the answer C is incorrect.
42. Here, the mould board plough is used for the primary land preparation in growing highland field crops. Hence the answer is (3)
50.  $P = \frac{F}{A}$ . As per this equation, the area on which the tyre covers the land  
When the area of the tractor tyre covering the land is increased, the pressure given by the tyre on the land will be lower. Hence, the answer is (4).

## 6. Irrigation and Drainage

- |         |         |         |         |         |
|---------|---------|---------|---------|---------|
| 1. (4)  | 11. (3) | 21. (2) | 31. (5) | 41. (1) |
| 2. (3)  | 12. (2) | 22. (3) | 32. (2) | 42. (3) |
| 3. (1)  | 13. (5) | 23. (5) | 33. (3) | 43. (5) |
| 4. (1)  | 14. (5) | 24. (4) | 34. (1) | 44. (4) |
| 5. (5)  | 15. (2) | 25. (3) | 35. (3) | 45. (2) |
| 6. (3)  | 16. (4) | 26. (4) | 36. (5) | 46. (3) |
| 7. (1)  | 17. (1) | 27. (5) | 37. (5) | 47. (3) |
| 8. (1)  | 18. (4) | 28. (3) | 38. (2) | 48. (2) |
| 9. (1)  | 19. (5) | 29. (1) | 39. (3) | 49. (5) |
| 10. (4) | 20. (2) | 30. (3) | 40. (2) | 50. (2) |

5. c - Pump is damaged as mud has blocked it

$$\begin{aligned} 11. \text{ Net Irrigation Demand} &= \frac{(FC_w - W_{TW}) \times P \times d}{100} \\ &= \frac{(20 - 10)}{100} \times 1.2 \text{ gcm}^{-3} \times 10 \text{ cm} \\ &= 1.2 \text{ cm} \end{aligned}$$

$$12. \text{ Water transportation efficiency} = \frac{Wf}{ws}$$

$$= \frac{70}{100} = \frac{Wf}{4000}$$

$$Wf = \frac{70 \times 4000}{100} \text{ l} = 2800 \text{ l}$$

(or) can calculate by considering the value for efficiency

$$= \frac{70}{100} \times 4000 \text{ l}$$

$$= 2800 \text{ l}$$

$$\begin{aligned} 20. \text{ Evapo transpiration of the Crop} &= \text{Crop Constant} \times \text{Recommended Evapo} \\ &\hspace{15em} \text{Transpiration} \\ &= 0.5 \times 0.9 \text{ mm/day} \\ &= 4.5 \text{ mm} \end{aligned}$$

22. Tank is not a natural water source.

23. Water is pushed to the suction tube through the foot valve

24. The theoretical head of a water pump is the height between the foot valve and the suction tube.

**(A/L) Agricultural Science - Multiple Choice Questions and Answers**

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32. Net Irrigation Demand = 12 cm  
Water Transportation Efficiency = 75%
- Net Water Supply Demand =  $\frac{\text{Net Irrigation Demand}}{\text{Water Transportation Efficiency}}$
- $= \frac{12}{\frac{75}{100}} \text{ or } \frac{100}{75} \times 12 \text{ cm}$
- $= \frac{12 \times 100}{75} = 16 \text{ cm}$
36. (5) – BG 452 – Long Age Rice Variety
46. Net Irrigation Demand = 16 cm  
Quantity of Water Loss = 4 cm  
Net Water Supply Demand = (16+4) cm  
= 20 cm

**7. Plant Propagation**

---

- |         |         |         |         |         |
|---------|---------|---------|---------|---------|
| 1. (4)  | 11. (3) | 21. (3) | 31. (2) | 41. (1) |
| 2. (3)  | 12. (4) | 22. (2) | 32. (4) | 42. (2) |
| 3. (5)  | 13. (4) | 23. (4) | 33. (4) | 43. (2) |
| 4. (3)  | 14. (3) | 24. (3) | 34. (5) | 44. (1) |
| 5. (1)  | 15. (4) | 25. (1) | 35. (5) | 45. (3) |
| 6. (5)  | 16. (5) | 26. (2) | 36. (4) | 46. (3) |
| 7. (3)  | 17. (5) | 27. (2) | 37. (4) | 47. (4) |
| 8. (5)  | 18. (3) | 28. (2) | 38. (5) | 48. (2) |
| 9. (4)  | 19. (5) | 29. (3) | 39. (2) | 49. (3) |
| 10. (5) | 20. (4) | 30. (4) | 40. (2) | 50. (5) |

**8. Plant Breeding**

---

- |         |         |         |         |         |
|---------|---------|---------|---------|---------|
| 1. (4)  | 11. (1) | 21. (3) | 31. (2) | 41. (3) |
| 2. (3)  | 12. (5) | 22. (2) | 32. (5) | 42. (2) |
| 3. (3)  | 13. (5) | 23. (4) | 33. (1) | 43. (3) |
| 4. (2)  | 14. (3) | 24. (5) | 34. (5) | 44. (3) |
| 5. (3)  | 15. (5) | 25. (3) | 35. (4) | 45. (3) |
| 6. (2)  | 16. (1) | 26. (3) | 36. (5) | 46. (2) |
| 7. (2)  | 17. (1) | 27. (5) | 37. (5) | 47. (3) |
| 8. (4)  | 18. (4) | 28. (4) | 38. (5) | 48. (2) |
| 9. (2)  | 19. (3) | 29. (4) | 39. (1) | 49. (2) |
| 10. (3) | 20. (4) | 30. (2) | 40. (2) | 50. (4) |

**(A/L) Agricultural Science - Multiple Choice Questions and Answers**

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6. Allele for the tall is T and the allele for dwarf is t ,  
 crossing between heterozygotic parents Tt Tt

Gametes	T t	T t	
Genotype	TT	Tt	Tt tt

The percentage of homozygous tall plants =  $\frac{1}{4} \times 100$   
 = 25%

10. Tall trait - T Dwarf trait - t  
 Green colour pod - G Yellow colour pod - g  
 F1 Generation ( Tall, Green pods) × Dwarf, Yellow pod

F <sub>2</sub> Tall, Green pod	23
Tall, Yellow pod	27
Dwarf, Green pod	24
Dwarf, Yellow pod	29

a. The above results obtained if alleles were segregated independently- so Statement A is wrong.

b. F1 plants were heterozygous. This statement is true.

If homozygous

	TTGG	×	ttgg	
	TG	TG	tg	tg
F <sub>2</sub>	TtGg	TtGg	TtGg	TtGg
	Tall, Green	Tall, Green	Tall, Green	Tall, Green

Results will be obtained.

If heterozygous

	TtGg	×	ttgg	
	TG	Tg	tG	tg
F <sub>2</sub>	TtGg	Ttgg	ttGg	ttgg
	Tall, Green	Tall, Yellow	Dwarf, Green	Dwarf, Yellow

c) True

d) Tall, Yellow plants of F2 are Ttgg. They are heterozygous. So statement D is wrong.

True statements are B & C. So answer is (3).

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11.  $F_2$  m%cks;fha  
 Dwarf, Green pod  $\times$  Dwarf, Yellow pod  
 $ttGg$   $ttgg$   
 $tG$   $tg$   $tG$   $tg$   $tg$   $tg$

	tG	tg	tG	tg
tg	ttGg Green, Dwarf	ttgg Yellow, Dwarf	ttGg Green, Dwarf	ttgg Yellow, Dwarf
tg	ttGg Dwarf, Green	ttgg Dwarf, Yellow	ttGg Dwarf, Green	ttgg Dwarf, Yellow

Ratio of dwarf, Yellow is 8 : 4

So the answer is 8/6 (1)

17. Flower colour red = R (dominant) white = r (recessive)  
 Colour of seed Green = G (dominant) yellow = g (recessive)  
 $RrGg \times RrGg$   
 Since segregate independently  
 gametes  $RG$   $Rg$   $rG$   $rg$   $Rg$   $Rg$   $rG$   $rg$

	RG	Rg	rG	rg
RG	RRGG Red, Green	RRGg Red, Green	RrGG Red, Green	RrGg Red, Green
Rg	RRGg Red, Green	RRgg Red, Yellow	RrGg Red, Green	Rrgg Red, Yellow
rG	RrGG Red, Green	RrrG Red, Green	rrGG White, Green	rrGg White, Green
rg	RrGg Red, Green	Rrgg Red, Yellow	rrGg White, Green	rrgg White, Yellow

The plants with Red colour flower and green colour offspring ratio = 9/16

25. Tall T  
 Dwarf t  
 Crossing between two heterozygous plants  $Tt \times Tt$   
 $T$   $t$   $\times$   $T$   $t$   
 $TT$   $Tt$   $Tt$   $tt$   
 Tall Dwarf  
 3 1

Answer is (3)



**(A/L) Agricultural Science - Multiple Choice Questions and Answers**

Crossing between  $F_1$  -  $TtGg \times TtGg$   
 $TG \quad Tg \quad tG \quad tg$   
 $F_2$  Phenotype - Tall,rounded Tall,loculed Dwarf,rounded Dwarf,loculed

19                      20                                      18                      21

If gametes are subjected to independent segregation, ratio obtained should be 9:3:3:1. So the genes responsible for these two traits are not tally with Mendel's law.

- (1) tall and round fruit are recessive characteristics.
- (2)  $F_1$  plants are homozygous for both characteristics.
- (3) tall and round fruit characteristics of  $F_2$  plants are homozygous.
- (4) the cross between an  $F_1$  plant with a dwarf locule fruited plant is not a test cross.
- (5) the above characteristics do not segregate independently.

So answer is (5)

33. Colour of flower: Red – R (dominant)    White – r (recessive)  
 Colour of seed:    Yellow – G (dominant)    Green – g (recessive)

$RrGg \times RrGg$

$Rg \quad Rg \quad rG \quad rg \quad Rg \quad Rg \quad rG \quad rg$

	RG	Rg	rG	rg
RG	RRGG Red yellow	RRGg Red yellow	RrGG Red yellow	RrGg Red yellow
Rg	RRGG Red yellow	RRgg Red green	RrGg Red yellow	Rrgg Red green
rG	RrGG Red yellow	RrGg Red yellow	rrGG White yellow	rrGg White yellow
rg	RrGg Red yellow	Rrgg Red green	rrGg White yellow	rrgg White green

The ratio of plants with red flower and green seeds are 1/16

41. Tall  $\times$  Dwarf     $T - \times t$   
 $F_1$  Tall             $Tt - t$



Parents should be TT and tt, if all  $F_1$  are tall.

$TT \times tt$   
 $F_1 \quad Tt \quad Tt \quad Tt$   
 $Tt \times Tt$   
 $TT \quad Tt \quad Tt \quad tt$   
  
 Tall                      Dwarf  
 3                      :                      1



### **10. Plant Physiology**

- |         |         |         |         |         |
|---------|---------|---------|---------|---------|
| 1. (4)  | 11. (5) | 21. (4) | 31. (4) | 41. (5) |
| 2. (4)  | 12. (2) | 22. (5) | 32. (1) | 42. (4) |
| 3. (3)  | 13. (3) | 23. (5) | 33. (2) | 43. (3) |
| 4. (5)  | 14. (2) | 24. (1) | 34. (4) | 44. (4) |
| 5. (5)  | 15. (3) | 25. (2) | 35. (4) | 45. (5) |
| 6. (4)  | 16. (3) | 26. (2) | 36. (4) | 46. (4) |
| 7. (3)  | 17. (3) | 27. (4) | 37. (5) | 47. (4) |
| 8. (5)  | 18. (2) | 28. (5) | 38. (2) | 48. (4) |
| 9. (4)  | 19. (5) | 29. (2) | 39. (2) | 49. (3) |
| 10. (1) | 20. (5) | 30. (4) | 40. (3) | 50. (2) |

### **11. Pest Control**

- |         |         |         |         |         |
|---------|---------|---------|---------|---------|
| 1. (2)  | 11. (4) | 21. (4) | 31. (1) | 41. (4) |
| 2. (4)  | 12. (5) | 22. (1) | 32. (2) | 42. (5) |
| 3. (3)  | 13. (5) | 23. (2) | 33. (2) | 43. (5) |
| 4. (0)  | 14. (1) | 24. (2) | 34. (4) | 44. (1) |
| 5. (5)  | 15. (3) | 25. (2) | 35. (4) | 45. (3) |
| 6. (1)  | 16. (4) | 26. (1) | 36. (1) | 46. (4) |
| 7. (2)  | 17. (5) | 27. (1) | 37. (5) | 47. (3) |
| 8. (4)  | 18. (2) | 28. (3) | 38. (3) | 48. (2) |
| 9. (3)  | 19. (3) | 29. (4) | 39. (5) | 49. (3) |
| 10. (2) | 20. (3) | 30. (3) | 40. (3) | 50. (2) |

### **12. Post Harvest Technology**

- |         |          |         |         |         |
|---------|----------|---------|---------|---------|
| 1. (4)  | 11. (3)  | 21. (5) | 31. (3) | 41. (3) |
| 2. (4)  | 12. (01) | 22. (4) | 32. (1) | 42. (3) |
| 3. (4)  | 13. (3)  | 23. (1) | 33. (3) | 43. (4) |
| 4. (3)  | 14. (1)  | 24. (3) | 34. (4) | 44. (5) |
| 5. (1)  | 15. (3)  | 25. (3) | 35. (1) | 45. (2) |
| 6. (4)  | 16. (2)  | 26. (3) | 36. (1) | 46. (3) |
| 7. (4)  | 17. (1)  | 27. (3) | 37. (3) | 47. (2) |
| 8. (3)  | 18. (4)  | 28. (1) | 38. (1) | 48. (2) |
| 9. (3)  | 19. (5)  | 29. (3) | 39. (2) | 49. (4) |
| 10. (3) | 20. (3)  | 30. (5) | 40. (1) | 50. (2) |

### 13. Home Gardening and Paddy Cultivation

- |         |         |         |         |         |
|---------|---------|---------|---------|---------|
| 1. (4)  | 11. (1) | 21. (2) | 31. (1) | 41. (3) |
| 2. (3)  | 12. (4) | 22. (4) | 32. (3) | 42. (4) |
| 3. (2)  | 13. (4) | 23. (4) | 33. (1) | 43. (1) |
| 4. (2)  | 14. (4) | 24. (3) | 34. (5) | 44. (1) |
| 5. (3)  | 15. (4) | 25. (2) | 35. (5) | 45. (1) |
| 6. (5)  | 16. (1) | 26. (3) | 36. (4) | 46. (3) |
| 7. (4)  | 17. (5) | 27. (2) | 37. (4) | 47. (5) |
| 8. (5)  | 18. (2) | 28. (3) | 38. (4) | 48. (1) |
| 9. (1)  | 19. (1) | 29. (4) | 39. (2) | 49. (3) |
| 10. (1) | 20. (4) | 30. (3) | 40. (4) | 50. (2) |

### 14. Animal Husbandry

- |         |         |         |         |         |
|---------|---------|---------|---------|---------|
| 1. (2)  | 11. (4) | 21. (1) | 31. (1) | 41. (2) |
| 2. (5)  | 12. (5) | 22. (5) | 32. (4) | 42. (2) |
| 3. (3)  | 13. (2) | 23. (2) | 33. (3) | 43. (3) |
| 4. (1)  | 14. (2) | 24. (4) | 34. (2) | 44. (4) |
| 5. (5)  | 15. (4) | 25. (1) | 35. (1) | 45. (2) |
| 6. (4)  | 16. (4) | 26. (1) | 36. (1) | 46. (1) |
| 7. (4)  | 17. (1) | 27. (5) | 37. (3) | 47. (5) |
| 8. (5)  | 18. (2) | 28. (1) | 38. (3) | 48. (3) |
| 9. (2)  | 19. (1) | 29. (4) | 39. (2) | 49. (1) |
| 10. (5) | 20. (3) | 30. (4) | 40. (2) | 50. (3) |

### 15. Food and Nutrition

- |         |         |         |         |         |
|---------|---------|---------|---------|---------|
| 1. (3)  | 11. (4) | 21. (2) | 31. (1) | 41. (4) |
| 2. (5)  | 12. (2) | 22. (3) | 32. (5) | 42. (4) |
| 3. (4)  | 13. (5) | 23. (1) | 33. (5) | 43. (4) |
| 4. (4)  | 14. (4) | 24. (3) | 34. (3) | 44. (5) |
| 5. (3)  | 15. (4) | 25. (3) | 35. (3) | 45. (3) |
| 6. (3)  | 16. (3) | 26. (3) | 36. (2) | 46. (1) |
| 7. (3)  | 17. (3) | 27. (1) | 37. (2) | 47. (5) |
| 8. (1)  | 18. (1) | 28. (3) | 38. (3) | 48. (4) |
| 9. (3)  | 19. (4) | 29. (2) | 39. (4) | 49. (4) |
| 10. (4) | 20. (1) | 30. (4) | 40. (3) | 50. (3) |

## 16. Eco Friendly Agriculture

- |         |         |         |         |           |
|---------|---------|---------|---------|-----------|
| 1. (2)  | 11. (5) | 21. (2) | 31. (2) | 41. (2)   |
| 2. (5)  | 12. (1) | 22. (3) | 32. (2) | 42. (2)   |
| 3. (3)  | 13. (2) | 23. (2) | 33. (1) | 43. (3)   |
| 4. (1)  | 14. (4) | 24. (4) | 34. (2) | 44. (5)   |
| 5. (2)  | 15. (1) | 25. (2) | 35. (3) | 45. (2)   |
| 6. (1)  | 16. (2) | 26. (5) | 36. (4) | 46. (5)   |
| 7. (1)  | 17. (5) | 27. (3) | 37. (3) | 47. (1/2) |
| 8. (3)  | 18. (2) | 28. (4) | 38. (5) | 48. (3)   |
| 9. (4)  | 19. (2) | 29. (5) | 39. (1) | 49. (4)   |
| 10. (3) | 20. (2) | 30. (4) | 40. (3) | 50. (5)   |

## 17. Agricultural Economics

- |         |         |         |         |         |
|---------|---------|---------|---------|---------|
| 1. (3)  | 11. (2) | 21. (4) | 31. (4) | 41. (3) |
| 2. (3)  | 12. (4) | 22. (4) | 32. (1) | 42. (3) |
| 3. (2)  | 13. (5) | 23. (3) | 33. (2) | 43. (3) |
| 4. (3)  | 14. (2) | 24. (4) | 34. (2) | 44. (1) |
| 5. (1)  | 15. (1) | 25. (1) | 35. (3) | 45. (3) |
| 6. (4)  | 16. (1) | 26. (5) | 36. (5) | 46. (3) |
| 7. (2)  | 17. (2) | 27. (3) | 37. (4) | 47. (4) |
| 8. (1)  | 18. (1) | 28. (3) | 38. (2) | 48. (4) |
| 9. (4)  | 19. (5) | 29. (3) | 39. (3) | 49. (5) |
| 10. (1) | 20. (3) | 30. (3) | 40. (2) | 50. (4) |

45.

$$\text{Price Elasticity of Demand} = \frac{\text{Percentage Change in the Quantity Demanded}}{\text{Percentage Change in the Price of the same Good}}$$

$$= \frac{\Delta Q}{\Delta P} \times \frac{P}{Q}$$

$$\Delta P = -100 \quad (1000-900)$$

$$\Delta P = .50$$

$$P = \frac{2.00 + 1.50}{2} = \frac{3.50}{2} = 1.75$$

$$Q = \frac{100 + 900}{2} = \frac{1900}{2} = 950$$

$$\text{Price Elasticity of Demand} = \frac{-100}{.50} \times \frac{1.75}{950}$$

$$= .3689$$

$$= .37$$

***(A/L) Agricultural Science - Multiple Choice Questions and Answers***

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3. Demand Equation  $Q_s = 1000 + P$   
Supply Equation  $Q_d = 1000 + 50P$   
 $= 1500 \text{ kg}$
15. Total Cost  $= \text{re}' 245,000$   
Variable Cost  $= \text{re}' 40,000$   
Total Cost  $= \text{Fixed Cost} + \text{Variable Cost}$   
Fixed Cost  $= \text{Total Cost} - \text{Variable Cost}$   
 $= 245,000 - 40,000$   
 $= \text{Rs. } 205,000$
33. Total Production when the number of labourers is 03  $= 42$   
Average Production of the 3rd labourer  $= \frac{42}{3}$   
 $= 14$
34. Marginal Product at the instance of the 6th labourer  $= 55 - 50$   
 $= 5$   
At this point, production will be reduced from 55 to 50.

# **DEFINITIONS - QUESTIONS**



## **2. Effect of Climate on Crop Cultivation**

1. What is meant by weather?
2. What is meant by climate?
3. What is meant by rainfall?
4. What is meant by precipitation?
5. What is meant by water cycle?
6. What is meant by lapse rate?
7. What is meant by vernalization?
8. What is meant by agro-climatic station?
9. What is meant by climate change?
10. What is meant by agro-ecological zone?

## **3. Effect of Soil Environment on Crop Cultivation**

1. What is meant by soil?
2. What is meant by rock?
3. What is meant by rock weathering?
4. What is meant by soil genesis?
5. What is meant by soil profile?
6. What is meant by soil depth?
7. What is meant by soil mineral?
8. What is meant by soil texture?
9. What is meant by soil structure?
10. What is meant by soil consistency?
11. What is meant by soil density?
12. What is meant by soil porosity?
13. What are meant by soil colloids?
14. What is meant by soil reaction?
15. What is meant by soil pH ?
16. What is meant by cation exchange capacity ?
17. What is meant by base saturation ?
18. What is meant by soil erosion ?
19. What is meant by soil degradation ?
20. What is meant by soil conservation

## **4. Plant Nutrition**

1. What is meant by plant nutrition ?
2. What is meant by an essential element ?
3. What is meant by fertilizer ?
4. What is meant by chemical fertilizer ?
5. What is meant by organic fertilizer ?
6. What is meant by compost fertilizer ?
7. What is meant by fertilizer efficiency ?
8. What is meant by integrated plant nutrition process ?
9. What are the mobile and immobile elements ?
10. What are meant by direct chemical fertilizer and undiluted fertilizer ?

## **5. Land Preparation**

1. What is meant by land preparation ?
2. What is meant by basic land preparation ?
3. What is meant by primary land preparation ?
4. What is meant by secondary land preparation ?
5. What is meant by inter-cultivation ?
6. What is meant by maximum/conventional/ standard land preparation ?
7. What is meant by minimum land preparation ?
8. What is meant by zero land preparation ?
9. What is meant by crop establishment ?
10. What is meant by a plant nursery ?

## **6. Irrigation and Drainage**

1. What is meant by crop water requirement?
2. What is meant by irrigation?
3. What is meant by recommended evapo-transpiration?
4. What is meant by a water source?
5. What is meant by a water pump?
6. What is meant by net irrigation water requirement?
7. What is meant by irrigation efficiency?
8. What is meant by micro irrigation?
9. What is meant by the water use efficiency?
10. What is meant by drainage and draining?

## **7. Plant Propagation**

1. What is meant by plant propagation?
2. What is meant by pollination?
3. What is meant by self-pollination?
4. What is meant by cross pollination?
5. What is meant by self-sterility?
6. What is meant by self-incompatibility?
7. What is meant by epigynous?
8. What is meant by a seed?
9. What is meant by multi-embryo?
10. What is meant by seed germination?
11. What is meant by seed viability?
12. What is meant by seed germination percentage?
13. What is meant by seed dormancy?
14. What is meant by the meaning of seed treatment?
15. What is meant by sexual propagation?
16. What is meant by asexual or vegetative propagation?
17. What is meant by layering?
18. What is meant by budding?
19. What is meant by tissue culture?
20. What is meant by micro propagation?

## **8. Plant Breeding**

1. What is Mendel's first law?
2. What is Mendel's second law?
3. What is meant by plant breeding?
4. What is meant by inbreeding?
5. What is meant by cross breeding?
6. What is meant by cross breeding strength ?
7. What is meant by bio-technology?
8. What is meant by genetic resource conservation?
9. What is meant by natural selection ?
10. What is meant by prominent gene ?

## **9. Environmental Control in Crop Cultivation**

1. What is meant by cultivation under controlled conditions?
2. What are meant by the plant propagation structures?
3. What is meant by soilless cultivation ?
4. What is meant by hydroponic crop cultivation ?
5. What is meant by meant by aero-ponic cultivation ?

## **10. Plant Physiology**

1. What is meant by photosynthesis?
2. What is meant by respiration ?
3. What is meant by transpiration?
4. What are meant by the anti-respiratory agents ?
5. What is meant by guttation
6. What is meant by ascent of sap ?
7. What is meant by phloem translocation?
8. What is meant by plant hormone?
9. What is meant by growth regulators?
10. What is meant by conjugated hormones?

## **11. Pest Control**

1. What is meant by a pest?
2. What is meant by the economic injury level?
3. What is meant by the economic threshold level?
4. What is meant by the plant pest epidemic condition?
5. Who are the insect pests?
6. What is meant by complete metamorphosis of insects?
7. What is meant by incomplete metamorphosis of insects?
8. What is meant by integrated pest management?
9. What is meant by insecticide?
10. What is meant by LD50 ?
11. What is meant by a weed plant ?
12. What is meant by an invasive dominant weed ?
13. What is meant by an annual weed plant?
14. What is meant by a perennial weed plant?
15. What is meant by a plant disease?

## **12. Post Harvest Technology**

1. What is meant by post-harvest loss?
2. What is meant by post-harvest technology?
3. What is meant by pre-harvest crop loss?
4. What is meant by harvest maturation index?
5. What is meant by grading of harvest?

## **14. Farm Animal Husbandry**

1. Who are the farm animals?
2. What is meant by animal nutrition?
3. What is meant by roughage?
4. What is meant by concentrates?
5. What is meant by hay ?
6. What is meant by silage?
7. What is meant by the digestive system of a farm animal?
8. Who are the ruminants ?
9. Who are called as broilers?
10. What is meant by Colostrum or first milk?
11. What is meant by the heat cycle?
12. What is meant by artificial insemination?
13. What is meant by the milking system of the cow?
14. What is meant by milk secretion ?
15. What is meant by milk ?
16. What is meant by lactation?
17. What is meant by milking a cow?
18. What is meant by milk adulteration ?
19. What is meant by animal disease?
20. What are meant by farm animal records?

## **15. Food and Nutrition**

1. What are meant by the essential fatty acids?
2. What is meant by the biological value of a protein?
3. What is meant by an essential amino acid?
4. What is meant by food spoilage?
5. What is meant by rancidity?
6. What is meant by food infection?
7. What is meant by food poisoning?
8. What is meant by food preservation?
9. What is meant by food diversity?
10. What is meant by value added food ?
11. What is meant by food packaging?
12. What is meant by a food preservative?
13. What is meant by a food flavor?
14. What is meant by flavor enhancer?
15. What is meant by Anti Oxidant ?
16. What is meant by under nutrition?
17. What is meant by malnutrition?
18. What is meant by over nutrition?
19. What is meant by Body Mass Index ?
20. What is meant by food labelling?

## **16. Ecofriendly Agriculture**

1. What is meant by chena cultivation?
2. What is meant by dry farming?
3. What is meant by integrated farming?
4. What is meant by conservative farming?
5. What is meant by agri-forestry?
6. What is meant by multi-layer crop cultivation?
7. What is meant by inter cropping?
8. What is meant by mixed crop cultivation?
9. What is meant by relay cropping?
10. What is meant by crop rotation?
11. What is meant by monocrop cultivation?

## **17. Agricultural Economics**

1. What is meant by entrepreneurship?
2. What is meant by utility?
3. What is meant by diminishing marginal utility theory?
4. What is meant by indifference curves?
5. What is meant by consumer demand?
6. What is meant by demand elasticity?
7. What is meant by supply?
8. What is meant by supply elasticity?
9. What is meant by market?
10. What is meant by Perfect Competitive Market?
11. What is meant by Monopoly Market ?
12. What is meant by Competitive Monopoly Market ?
13. What is meant by Oligopoly Market?
14. What is meant by production cost?
15. What is meant by the iso-production curve?
16. What is meant by production possibility curve?
17. What is meant by a farm?
18. What is meant by farm management?
19. What is meant by a business plan?
20. What is meant by marketing?

# **DEFINITIONS - ANSWERS**

## **2. Effect of Climate on Cultivation**

1. Weather is a short term condition of the atmosphere at a certain place such as rainfall, temperature, air pressure, wind speed, wind direction and moisture content in the air and prevalence of solar radiation.
2. It is an average environmental condition of a certain place after studying weather data for a certain place for a long period (long term average of weather data for a certain area).
3. Rainfall is a dropping of water from the clouds to the earth in the form of water droplets of 1-5mm diameter.
4. Precipitation is a form of atmospheric water to the earth in liquid or solid forms.
5. Water cycle is the process of water reaching to the initial location after passing through different stages and different time periods at different places.
6. Lapse rate is an atmospheric temperature decreases by  $6.4^{\circ}\text{C}$  when altitude increases by 1000 m.
7. Vernalization is the treatment of seeds or bulbs of the plants grown in the temperate zone by exposure to low temperature of  $0-10^{\circ}\text{C}$  to decrease vegetation and to include flowering to bear fruits quickly.
8. It is a centre established to collect weather data required to facilitate smooth agricultural practices.
9. Significant changes in average climatic condition or its changes existing for a long time. This condition emerges as a result of long term changes created by human beings.
10. Agro-ecological zone is an area with similar environmental factors such as combination of climate, soil, geography and diversity of usage of land.

### 3. Effect of Soil Environment to the Crop Cultivation

1. Soil on earth is a dynamic body that consists of minerals, organic matters, countless organisms, air and water. It is the medium for the growth of terrestrial plants.
2. Rock is a solid mass formed as a result of the accumulation of minerals in large quantities.
3. Rock weathering is the process of formation of parental material as the result of physical, chemical and biological processes that take place on bed rock in the nature.
4. Soil genesis is a process of soil formation by combining parental matter formed as a result of rock weathering with the organic materials & being exposed to different climatic conditions over time.
5. Soil profile is a cross section of a soil layer that shows the position of different layers from the surface to the parental rock.
6. Soil depth is the thickness of A, B, C layers from the surface of the soil to the parental rock.
7. Soil mineral is homogeneous inorganic matter with a definite chemical composition
8. Soil texture is the relative percentages of mineral particles such as clay, silt and sand of a soil
9. Soil structure refers to the binding of primary particles such as clay, silt and sand with bonding materials and getting arranged as secondary particles.
10. When the exerted force on a soil particle is gradually increased, at one point, the soil particle will break into pieces. Soil Consistency is the resistance shown by the soil particle against the cracking of it.
11. Soil density is the mass in a unit of soil volume
12. Soil porosity is the percentage of the ratio of space volume to the total volume of the soil.
13. Soil colloids are extremely small particles of soil with less than 0.002mm in diameter and suspended them in a larger surface area.
14. Soil reaction is the acid or base condition of soil.
15. Soil pH is the inverse of logarithmic value of H<sup>+</sup> concentration of a soil solution.
16. Cation exchange capacity is the amount of exchangeable cations in a unit weight of dry soil.
17. Base saturation percentage is the percentage of basic cations that are held on soil exchange in comparison to the total number of sites.
18. Soil erosion means the transportation of a portion of soil as particles or as a collection to another place and being deposited.
19. Soil degradation is the decline in soil quality caused by its improper use usually for agriculture, pastoral, industrial, urban purposes
20. Soil conservation is a method applied to avoid or minimize the separation and transportation of soil particles and to get the maximum yield from the soil and to use soil correctly and sustainably.

## 4. Plant Nutrition

1. Plant nutrition is the study of the chemical elements and compounds necessary for plant growth, plant metabolism and their external supply.
2. If the activity of particular element cannot be performed by another element, the plant cannot grow and complete its normal life cycle without a particular element. If it directly affects the metabolism of the plant, that element is called as an essential element.
3. Fertilizer is the substance that is added to the soil to provide essential elements required for plant growth.
4. Chemical fertilizer is the manufactured inorganic fertilizer that is bought from the market.
5. Organic fertilizer is the substances of either plant or animal origin providing nutrients to the soil for plant growth by decaying and decomposing.
6. Compost fertilizer is the manure that is produced under human control by decaying organic matter rapidly and uniformly using microbes and without losing its nutrients.
7. Fertilizer efficiency is the percentage of the actual fertilizer used by the plant out of the total fertilizer applied to the plant.
8. IPNS is the plant nutrition system that is used as a source of organic and inorganic plant nutrients, that ensures soil fertility, sustainability of crop production and considers social acceptability, economic efficiency and environmental suitability.
9. Movable elements are the elements that can travel from older tissues to new growing tissues through phloem tissues of vascular system.  
Eg: N, P, K  
The elements that do not travel like that are immovable elements.  
Eg: Ca, S, Mn
10. The fertilizer that is used to provide only one element is called direct inorganic fertilizer.  
Eg: Urea  
The fertilizer that is produced by mixing two or more elements are called a mixed fertilizer.  
Eg: Coconut fertilizer mixture

## **5. Land Preparation**

1. Land preparation is physical preparation of the soil to germinate seeds afterward have proper crop growth.
2. It is the process of preparing the land, before cultivating the crop in the field.
3. It is the process of loosening the compressed soil in other words ploughing.
4. It is the process of converting the soil into the fine particles, after the primary land preparation.
5. Conducting different land preparation activities after establishing the crop and it is in the field.
6. It is the post land preparation performed after the basic land preparation.
7. Secondary land preparation is done only to the planting row safter following the primary land preparation in the entire field.
8. Preparation of land only on planting rows without doing the primary land preparation of the field.
9. Planting seedlings or seeds, germinating seeds and establishing as a crop in the field.
10. Plant nursery is the place where planting materials are looked after until it is established in the permanent field or a place where plants are propagated and grown to get healthy, uniform and hardy plants which can be planted in the field within the short period of time.

## **6. Irrigation and Drainage**

1. The volume of water required for a certain crop to get the normal growth and the yield at the certain place within a particular period of time.
2. Supplying of external water to fulfill the water requirement of a crop when water received from rainfall is not sufficient.
3. The volume of water that transpire in the extent of a green grassland of an imaginary height of 0.12m, with a constant pressure of 70 m/s, with an albedo of 0.23m, of a uniform height, dynamic growth well irrigated and fully covered ground is equal to the volume of water evapotranspired from an imaginary green plant over a particular period of time.
4. A water source in a place where water can be obtained throughout the year or within a certain period of time during a year to fulfill the water requirement.
5. An equipment that is used to increase water pressure when it is difficult to bring water from the water source to the field under gravitational force or there is a necessary to increase pressure of water to be irrigated or when necessary.
6. Presenting the required volume of water to be supplied to a certain soil at a certain time to bring it to the field capacity as height.
7. Presenting the volume of water that was used by the crop as a percentage of total water supply.
8. Supplying limited amount of water with pressure according to the crop water requirement to the limited area of the soil, using a planned pipeline system.
9. The amount of the yield produced from a unit of water used on evapotranspiration.
10. Drainage is the natural process of removal of excess water from the soil.

The removal of excess water in the soil using the artificial methods is called draining of water.

## **7. Plant Propagation**

1. Producing new plants to ensure the existence of a particular species is called propagation.
2. Falling of pollen grains on the stigma.
3. Deposition of pollen grains of a flower on stigma of the same flower or another flower in the same plant.
4. Applying of pollen grains of a flower on the stigma of a flower of another plant of the same species.
5. When pollen grains fall on a flower of the same plant, those pollen grains do not germinate.
6. Although the pollen of a plant get deposited on the stigma of the flower of the same plant, fertilization do not occur due to the failure of entering the pollen tube into the stigma or the poor growth of the pollen tube.
7. Production of seeds without fertilization.
8. Embryonic plant enclosed in a protective outer covering and it is the product of ripened ovule which occurs after fertilization.
9. More than one embryo in one seed.
10. Sprouting of a seedling from a seed by blasting seed coat.
11. Ability of germinating the potential of germinating of the seeds in the presence of favorable conditions such as moisture, temperature and air.
12. Percentage of seeds that germinated within a given period of time after providing the required conditions to the total number of seeds in the sample.
13. Inability to germinate although favourable conditions such as moisture, temperature and oxygen are provided, live seeds do not germinate.
14. Applying any activity that is performed for seeds before establishing a nursery or planting to get successful, healthy plants and to ease the process of planting.
15. Obtaining new plants from vegetative parts of a plant.
16. Propagation by using the vegetative parts of a plant rather than seeds without union of gametes.
17. Kind of propagation by stimulating rooting in a branch while it is still attached to the mother plant after growing roots.
18. Method of plant propagation in which a bud of the plant to be propagated is grafted on to the stem of another plant.
19. Producing plants under controlled environment, artificial growth medium and aseptic conditions using any live plant part.
20. Rapidly multiplying stock plant material to produce a large number of progeny plants, using modern plant tissue culture method.

## **8. Plant Breeding**

1. In gamete formation, two genomes of a particular characteristic segregate from each other and form gametes which carries only one allele for each gene.
2. When gametes are produced, any of the genes in pair affecting a characteristic of a living organism can enter in to any genome. Also, when two gametes fertilize with any other gene in pair, they freely combine with any of these genomes.
3. In order to reach the crop production targets, creating of a new genetic constitute or plant traits and selection of plants with favourable genetic index are known as plant breeding.
4. Inbreeding is a cross breeding among closely related plants.
5. Cross breeding means, plants are crossed among two or more plant species of different genetic composition.
6. Cross breeding vigour means, development of desired useful characteristics of new plants,
7. Producing any plant, animal or microbe using either organisms or tissues of the organisms and manipulating the existing organisms to be used for specific purposes.
8. Managing genetic resources to be used sustainably for the use of the next generations.
9. Selection of the most suitable mother plants in order to produce the next generation of a plant population.
10. In chromosomes, if one allelic gene can suppress the other allelic gene, the initial gene is called a prominent gene.

## **9. Environmental Control in Crop Cultivation**

1. Improving the crop growth, the yield and the quality by artificially controlling aerial and soil environmental factors to suit the crop.
2. Structures that are used to control one or many factors necessary for crop production like temperature, sun light, relative humidity and wind under controlled conditions.
3. Cultivation of crops without using soil
4. Cultivation of crops in water based media
5. The process of growing plants in an air, therefore it's roots system hang in the aerial environment without use of soil.

## **10. Plant Physiology**

1. Bio chemical process convert solar energy into chemical energy in the chlorophyll contained living cells by using sunlight, water and carbon dioxide. The produced is stored as carbohydrate molecules.
2. Process of producing energy by breaking organic compounds through a series of enzymatic reactions.
3. Removal of water from the aerial parts of plants through evaporation.
4. Materials used to reduce transpiration.
5. The exudation of drops of xylem sap on the tips or edges of leaves of some vascular plants due to the force exerted by root pressure.
6. Radially transported water from xylem tissues of the middle of the plant root to plant leaves through roots and stem along xylem.
7. Transportation of organic food produced in Photosynthesis to the rapidly growing plant parts such as growing buds, food storing bulbs, tube and corms through phloem tissues.
8. Minutely required organic materials that is naturally produced in the plant and they do not act at the point of production but travel to another place to control the growth or any other plant physiology process.
9. Artificially produced plant hormones.
10. Plant hormones that are combined with metabolic reaction co-valent bonds with less metabolic weight.

## 11. Pest Control

1. A living being that economically damages human beings, livestock, cultivated crops, stored products or any material that is used by human.
2. Minimum population density that starts to damage a certain crop economically.
3. The maximum population density at which the pest control has to be started to avoid the population density reaching the economical injury level.
4. When a pest population reaches an economically injury level within a short period of time it is called an epidemic condition and has come to a stage of causing serious economic damage.
5. A living being belong to Phylum of Arthropoda and Class of insecta and damage crops.
6. When a living being that complete all stages of an insect namely eggs, larva, pupa and adult within the life cycle is called complete metamorphosis of insects.
7. When a living being that complete only egg, nymph and adult stages within the life cycle of a pest.
8. Managing pests using minimum chemical pesticides in combination with other pest control methods at an appropriate time to maintain pest population below economically injury level.
9. Chemicals that are used to control insects.
10. The chemical dose required to kill 50% of the pest population.
11. A plant that compete with the crop for nutrients, water, space and light disturbing its growth and survival.
12. Any plant that originates in one eco system in a country, moves and grows in another similar eco-system in another country and damages the existing eco-system and its bio-diversity.
13. When weeds complete its growth, flowering, producing seeds and dies within one year or lesser period, it is called as annual weed plant.
14. Weed plants that live more than one year.
15. Deviation of a whole plant or a part of a plant from its normal condition due to a pest.

## 12. Post Harvest Technology

1. Qualitative and quantitative damage caused to the yield from harvesting to purchasing by the consumer.
2. A collection of technological methods used to minimize qualitative and quantitative damages while protecting and improving the quality of the yield when needed from harvesting to consumption.
3. Damage caused to the harvest due to adverse conditions of factors affecting the crop growth from crop establishment in the field to harvesting.
4. Improved crop harvest that suits the requirements of the consumer.
5. Sorting the yield based on the difference of weight, shape, colour and texture of the yield.

## **14. Farm Animal Management**

1. Animals that are reared at a farm to obtain different products.
2. Provision of nutrients to meet different body requirement of animals.
3. Plant originated food with relatively little protein and fat and more than 18% of crude fibre.
4. Easily digestible food with less than 18% crude fibre.
5. Grass that is stored after drying in a way that the green colour of the raw grasses does not get disappear completely.
6. Food that is produced by fermenting Grasses and legumes which contains medium water content (40 - 45%), under controlled conditions.
7. A tubal structure consisting of muscles and tube tissues.
8. Mammals that depend on plant based food completely and have a complexed stomach.
9. Type of chicken produced by cross breeding two species with the aim of getting maximum growth within a short period of time and getting meat in 35 days.
10. Nutritious milk that is secreted from nipples 4-5 days from the delivery.
11. The period of time from the beginning of one heat to the beginning of the next heat.
12. Deposition of semen by using instruments in the vagina or cervix of a cow with in heat after evaluating and preparing collected semen from a selected stud bull with good characteristics.
13. A system developed from sweat glands to produce milk and feed to the young ones.
14. Milk contained enrich with protein, carbohydrates, vitamin, minerals and fats secretes through epithelial tissues to the alveoli cavities.
15. A nutritious, complex, emulsion-like compound naturally produced in mammary glands.
16. Releasing stored milk in alveoli cavities through milk veins to the mammary the glands and nipples by an external stimulant.
17. Removing milk in nipple through a nipple duct.
18. Reducing the quality of milk by changing its taste, appearance and composition.
19. Deviation of an animal from its normal condition
20. Different reports that record different activities taking place in a livestock farm.

## **15. Food and Nutrition**

1. Unsaturated multi fatty acids that are not produced in the body.
2. Possibility of the availability of essential amino acids in a protein.
3. Amino acids that cannot be produced in the body and need to be taken through food.
4. Food becomes spoil, therefore it is unpleasant to consume or food becomes unsafe and unhealthy for consumption.
5. The process of producing unpleasant taste and smell as a result of chemical degradation of the food consisting of fat and oil.
6. Becoming ill due to the intake of food containing microbes.
7. Becoming ill after consuming food, which has microbial growth and metabolic products produced on food.
8. Food Preservation is a process which is handled to avoid wastages by controlling spoilage factors artificially, while maintaining nutritional value, texture, taste and appearance of the food.
9. Presenting food to the market in different forms while making it easy to use and meeting consumer preferences.
10. A change in the physical state or appearance of the product to increase its value or value addition.
11. A device or a tool that is used as food to minimize wastage and to protect a food from the production till it reaches to the consumer.
12. A substance that inhibit the growth of bacteria, yeast or fungi in any item of food.
13. Constitute or group of constitutes that has a combination of characteristics to give taste intensity.
14. A material that does not improve taste of a food but enhances its natural taste.
15. An active substance that prevents oxidation.
16. Incorrect nutrition level or a condition that occurs as a result of taking less or more than the required levels of one or a few essential nutrients.
17. A health condition that occurs as a result of not taking one, few or all of the nutrients in sufficient amounts.
18. A condition that occurs as a result of taking more than the required level of food for a long time.
19. A value calculated by dividing body weight of a person by the square root of the body height.
20. Incorporating a printed label with relevant details in the packaging with the aim of providing accurate information which helps consumers to have correct understanding of the food.

## **16. Eco-friendly Agriculture**

1. Chena cultivation is the conventional mixed farming method which continues from the ancient period, and practices using rainfall.
2. Cultivating crops by efficiently utilizing small quantities of water in areas where the annual rainfall is less than 500 mm.
3. Operating different agro industries such as crop cultivation, animal husbandry and power generation in a mutually beneficial manner in one farm at the same time by using byproducts of one industry as ingredients for another industry.
4. While protecting biodiversity, cultivating crops by applying suitable methods to conserve soil, water and nutrients of a certain place.
5. Crop management system with different biological combinations while maintaining the balance of forest ecosystems and sustainable land use in productively, economically and agriculturally.
6. A system which using several crops cultivation in layers.
7. Cultivating one or a few short term crops in between the main crop without creating a competition with the main crop in the same land.
8. Cultivation of annual and perennial crops to get maximum productivity from the land with similar attention, without creating competition among crops.
9. Cultivation of the second crop after initial crop completes the vegetative phase and enters in to the breeding phase in the same field in order to minimize competition among crops.
10. Cultivation of selected few crops with different vegetative patterns in the same field in a rotational manner for the different seasons.
11. Continuous cultivation of crops of the same species in the same field.

## **17. Agricultural Economics**

1. Starting profit oriented businesses and the optimal usage of production inputs.
2. Benefit or satisfaction gained by consuming or having ownership of goods and services.
3. If a consumer increases the number of units consumed of a particular good while keeping the quantities of other goods unchanged, marginal utility of the particular good gradually decreases.
4. The line which combines the points of different combinations of the same levels of utilities from different goods and services consumed by a consumer.
5. The ability preference of a consumer to purchase a good at different prices.
6. The change in demand as a response to a relative change in a factor which affects demand.
7. The total quantity of good released to the market by a producer at a certain period of time to sell at a certain price.
8. Relative change of supply as a result of the relative change in the price of that good.
9. Any condition that leads to build an exchange relationship between suppliers and buyers in the process of the exchange of goods and services.
10. Market that operates with a large number of suppliers and buyers at a given price.
11. Market situation where only one producer and a large number of buyers exist for a good.
12. A market condition that has a higher number of buyers and a relatively higher number of producers compared against a monopoly and the existence of a product differentiation.
13. A market condition that has a large number of buyers and few suppliers with or without product differentiation.
14. The cost incurred on the factors of production used in the production process of a particular good or service.
15. The line that connects the points of different combinations of factors, showing similar production levels.
16. If a producer can produce two goods using available inputs and technology, the curve that shows maximum output combination.
17. A business unit that is organized to produce one or a few agricultural consumer products.
18. Operating a profitable farm business utilizing its resources efficiently.
19. The document that shows the investment of the capital and expenses to be incurred by a new or expanding business.
20. Integrative process of achieving business targets by satisfying needs and wants of humans.

# **STRUCTURED ESSAY - QUESTIONS**



**1. The Development of Agriculture in Sri Lanka**

- 1. i The Mahaweli development scheme is the largest development scheme implemented in Sri Lanka. State which reservoir has the,
  - a least capacity .  
.....
  - b largest capacity .  
.....
- i State four objectives of the Mahaweli development scheme.
  - a .....
  - b .....
  - c .....
  - d .....
- ii State two problems that arose as a result of the Mahaweli development scheme.
  - a .....
  - b .....
- 2. Ancient irrigation systems consisted of tanks, channels and anicuts.
  - i State the names of the kings who built the following tanks
    - a Thisa wewa - .....
    - b Minneriya wewa - .....
    - c Kala wewa - .....
    - d Parakrama Samudraya - .....
  - i State two reasons why ancient kings of Sri Lanka engaged in the construction of irrigation tanks.
    - a .....
    - b .....
  - ii State one function of the following parts of irrigation tank (wewa)

<b>Part</b>	<b>Function</b>
a Break water (Relapanawa)	- .....
b Spill gate	- .....
c Sluice gate	- .....
d Biso kotuwa	- .....
  - iv. State two ways the environment is conserved due to irrigation tanks and anicuts.
    - a .....
    - b .....

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3. According to written history , Sri Lanka had been a self-sufficient country in the past.
- i State two evidences to prove that Sri Lanka had a self-sufficient economy
    - a .....
    - b .....
  - i State two reasons for the existence of a self-sufficient economy in ancient times
    - a .....
    - b .....
  - ii Give the name of the king who contributed to building self-sufficient economy  
.....
  - iv. Name the source of the written evidence to prove that there was a self-sufficient economy  
.....
4. During the rule of the British, priority was given to the plantation sector .
- i Name four main plantation crops which were introduced by the British to Sri Lanka.
    - a .....
    - b .....
    - c .....
    - d .....
  - i State two advantages of plantation agriculture.
    - a .....
    - b .....
  - ii State three disadvantages of the plantation agriculture.
    - a .....
    - b .....
    - c .....
  - iv. State two non-conventional agricultural crops that target the export market at present.
    - a .....
    - b .....
5. (A) To ensure food security in Sri Lanka, various measures have been taken.
- i What is Food security  
.....  
.....  
.....
  - i Write two steps taken to ensure food security in Sri Lanka
    - a .....
    - b .....

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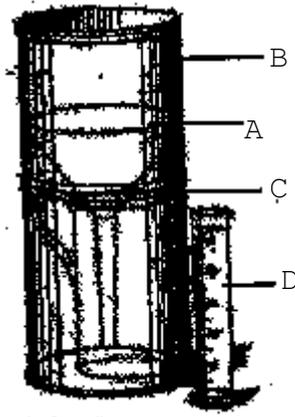
- i 'Food security contributes to the development of the country'. State two reasons to prove this statement.
  - a .....
  - b .....

(B) Both government and Non-government organizations are contributing to the development of agriculture development in Sri Lanka.

- i State two roles of the following government organization and non-government organization for the development of agriculture in Sri Lanka.
  - a The Department of Agriculture
    - 1 .....
    - 2 .....
  - b The Department of Agrarian Services
    - 1 .....
    - 2 .....
- i State two private institutes and two non-government organizations that contribute to the development of agriculture
  - a Private Institutes
    - 1 .....
    - 2 .....
  - b Non-government Organizations
    - 1 .....
    - 2 .....

2. Climate

1. (A) - The following diagram shows a non recording type rain gauge



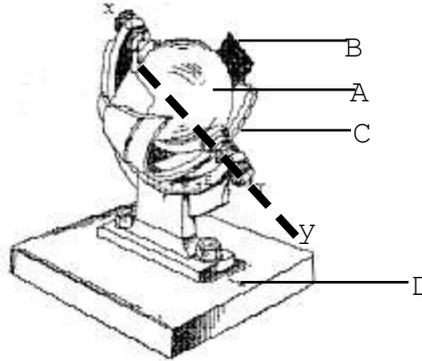
- i. Name A, B, C and D in the diagram.
  - A- .....
  - B- .....
  - C- .....
  - D- .....
- ii. List three factors that need to be considered when a rain gauge is being installed at the meteorological unit.
  - a. ....
  - b. ....
  - c. ....
- iii. What is the height from ground level to the inlet of the funnel of the instrument ?  
.....
- iv. What is the advantage of part "B" ?  
.....
- v. What is the function of 'D' ?  
.....
- vi. What is the advantage of ensuring that the diameter of 'D' is less than the comparative diameter of 'A' ?  
.....
- vii. The water collected during that 24 hours in the above rainguage was measured using a measuring cylinder .The collected amount of water was  $624\text{cm}^3$ . The diameter of the inlet of the funnel is 12.7cm. Find the rainfall during the last 24 hours.  
.....  
.....  
.....

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viii. Write two advantages of using an automatic rain gauge in comparison to a non-recording typed rain gauge.

- a. ....
- b. ....

2. Given below is a diagram of a solar shine recorder .



i. Name A, B, C, D.

- A - .....
- B - .....
- C - .....
- D - .....

i. In which direction should the X-Y direction axis be adjusted?

.....

ii. Why should 'A' be spherical?

.....  
 .....

iv. Draw a sketch to show the situation if there was no sunlight between 12 noon and 2 p.m.

v. Plants can be categorized into three categories according to the duration of sunlight. List three categories with two examples of each.

**category**

**examples**

- |         |           |         |
|---------|-----------|---------|
| 1. .... | - 1 ..... | 2 ..... |
| 2. .... | - 1 ..... | 2 ..... |
| 3. .... | - 1 ..... | 2 ..... |

vi. What is the name given of the response of plants to the sunlight duration.

.....

vii. What is the hormone that is important to induce flowering in plants?

.....

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viii. State the effect of the following colours of the spectrum to plant.

**Impact on plant growth**

- a Red - .....
- b Green - .....
- c Yellow - .....
- d Blue and Red - .....

3. i State the instruments that can be used to measure the following temperatures.

- a High temperature - .....
- b Low temperature - .....

i Write down the impact of temperature fluctuations in the environment on crop cultivation.

- a High temperature - .....
- b Low temperature - .....

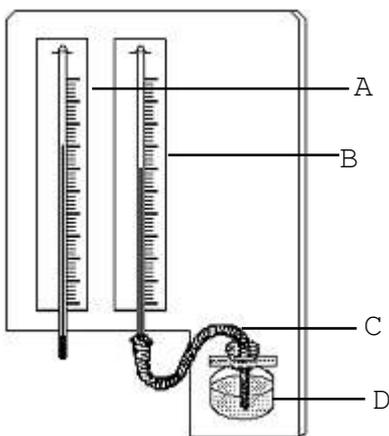
ii State four factors that contribute to temperature fluctuations the environment in different regions.

- a .....
- b .....
- c .....
- d .....

iv. Draw the graph below to show the relationship between the rate of photosynthesis and temperature.



4. The illustration given below is a wet and dry bulb thermometer



Room Tem. \ Tem. Diff.	0.5	1.0	1.5	2.0	2.5	3.0	3.5
33	96	93	89	86	83	80	76
32	96	93	89	86	83	79	76
31	96	93	89	86	82	79	75
30	96	93	89	85	82	78	75
29	96	92	89	85	81	78	74
28	96	92	88	85	81	77	74
27	96	92	88	84	81	77	73
26	96	92	88	84	80	76	73

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i. Name A, B, C, D in the above equipment

A- .....

B- .....

C- .....

D- .....

i. What is the force that brings the liquid in D to the bulb of the thermometer

.....

ii. What is the reason for the difference between A and B readings?

.....

.....

iv. If the reading of 'A' is  $30^{\circ}\text{C}$  and 'B' is  $27^{\circ}\text{C}$  what is the relative humidity at that time?

.....

.....

.....

.....

v. Reading of 'A' was the same at X and Y locations and this was  $31^{\circ}\text{C}$ . The reading of 'B' at X location is  $29^{\circ}\text{C}$  and the reading of 'B' at Y location is  $28^{\circ}\text{C}$ . Calculate and find which location has the higher relative humidity.

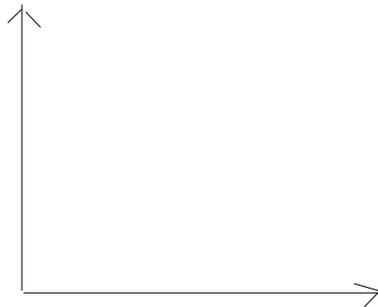
.....

.....

.....

.....

vi. Draw the graph to show the relationship between the rate of transpiration and relative humidity.



vii. High relative humidity positively affects crop cultivation. State two of them.

a .....

b .....

viii. Relative humidity creates negative effects on crop cultivation. State three of them.

a .....

b .....

c .....

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5. Meteorological data are very important to plan agricultural activities.

- i. Name the instruments used at the agrometeorological station that measure parameters of weather, using them.

<b>Parameter</b>	<b>Instrument</b>
a .....	.....
b .....	.....
c .....	.....
d .....	.....
e .....	.....
f .....	.....
g .....	.....
h .....	.....

- i. State how meteorological data are important in crop cultivation in three different manners.

- a .....
- b .....
- c .....

- ii. State one factor needed to be considered when the following weather instruments are installed.

- a Rain gauge - .....
- b Anemometer - .....
- c Wind vane - .....
- d Thermometer - .....

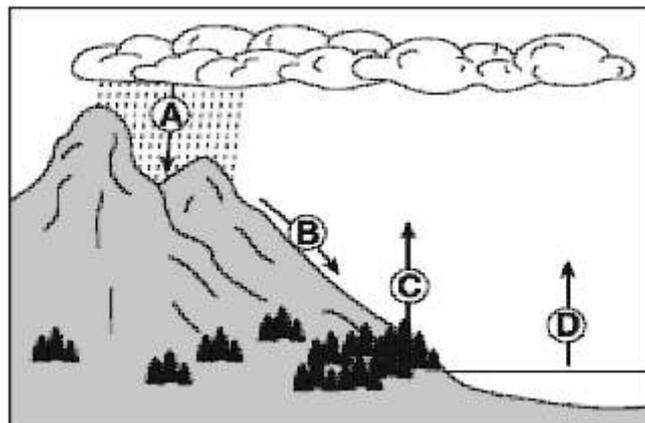
- iv. Name weather parameters that are measured once a day.

- a ..... b .....
- c ..... d .....

- v. What are the standard times of data collection at a meteorological station ?

.....

6. A diagram of a Hydrological cycle is shown below.



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i. Name A, B, C, D in the diagram.

A- .....

B- .....

C- .....

D- .....

i. State two processes which make a maximum contribution to the hydrology cycle.

a .....

b .....

ii. What is the phenomena that contributes to increase the ground water level?

.....

iv. State three human activities which lead to a change in the processes of the hydrology cycle.

a .....

b .....

c .....

7. According to the mechanism of rainfall active in Sri Lanka, the climatic conditions of different regions are determined

i. List the rain fall mechanisms active in Sri Lanka

a .....

b .....

c .....

i. State the period in which each mechanism of rainfall given below is active in Sri Lanka.

Rainfall mechanism

Rainy period

a First intermonsoonal season .....

b South-west monsoonal season .....

c Second intermonsoonal season .....

d North-west monsoonal season .....

ii. Different climatic systems are developed as a result of the changes in air pressure.

State three main climatic systems.

a .....

b .....

c .....

iv. What are the three basic requirements that need to be fulfilled in a climatic system for a cyclonic condition to develop ?

a .....

b .....

c .....

- v. State the cropping seasons of Sri Lanka and the respective mechanisms of rainfall that contribute to the cropping seasons.

**Cropping season**

**Mechanism of Rainfall**

- a .....  
b .....

- iv. State three adverse effects of rainfall on the crop cultivation

- a .....  
b .....  
c .....

8. i. Write down four main factors that determine the climatic condition of Sri Lanka

- a .....  
b .....  
c .....  
d .....

- i. State five factors considered in demarcating ecological zones.

- a .....  
b .....  
c .....  
d .....  
e .....

- ii. State three main climatic zones in Sri Lanka and their annual averages rainfall.

**Climatic zone**

**Average annual rainfall (mm)**

- a .....  
b .....  
c .....

- iv. Write down the number of ecological zones that belong to each climatic zone

**Climatic zone**

**Number of ecological zones**

- a .....  
b .....  
c .....

- v. State four uses of demarcating the ecological zones of Sri Lanka.

- a .....  
b .....  
c .....  
d .....

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vi. one of the ecological zone is symbolized as W L<sub>1b</sub>

a. Name that ecological zone.

.....

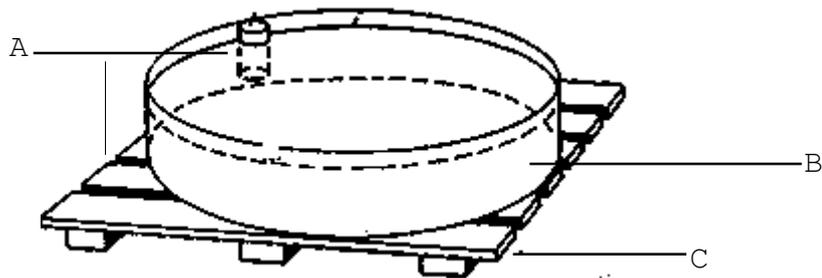
b. State the annual rainfall of that ecological zone ?

.....

c. What is the altitude of the above mentioned ecological zone.

.....

9. The diagram given below is an evaporation pan in the agro-meteorological station.



i. Name A, B, C, D components of the instrument

A - .....

B - .....

C - .....

ii. What is the use of part "A"

.....

iii. What is the height of X in centimeters ? .....

iv. State four factors that should be considered when preparing and using the equipment above.

a. ....

b. ....

c. ....

d. ....

v. How do you amend the reading of the above equipment on a rainy day?

.....  
 .....

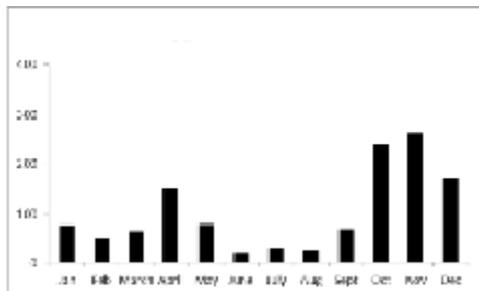
vi. By using the following readings calculate the daily evaporation rates

- Reading of the evaporation pan on the previous day = 180 m m
- Reading of the evaporation pan on the following day = 185 m m
- Total rainfall received = 10 m m

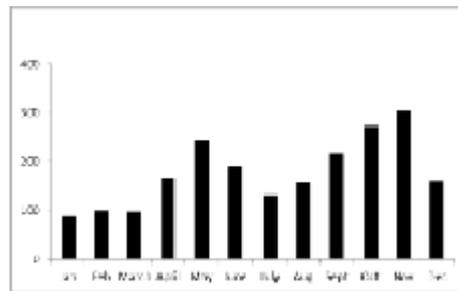
.....  
 .....  
 .....

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10. The graph given below show the rainfall pattern of Galle and Anurachhapura towns.



A



B

- i. From the towns given above, name the town that represents each rainfall pattern A and B.
  - A - The town which shows the rainfall pattern represented by graph A - .....
  - B - The town which shows the rainfall pattern represented by graph B - .....
- i. State the climatic zones of Galle and Anurachhapura
  - Anurachhapura - .....
  - Galle - .....
- ii. How many agro ecological zones are there in the new agro-ecological map? .....
- iv. What does each symbol indicate in the following agro-ecological zone.
  - $IU_{3a}$
  - a. I - .....
  - b. U - .....
  - c. 3 - .....
  - d. a - .....

### 3. Effect of soil factors on crop harvest

1. The teacher teaching the class instructed the students to measure the moisture percentage of several soil samples of the school premises.
  - i. State three methods which can be used to measure the moisture percentage of a soil sample.
    - a. ....
    - b. ....
    - c. ....
  - ii. Out of the above stated method which one would you use to measure the moisture content of the soil samples collected from the school premises. Give your reason for selecting that method.  
Method - .....  
Reason - .....
  - iii. Name the equipment used to collect the sample  
.....
  - iv. From the collected soil sample 50g was weighed and heated at 105°C until the weight measured a constant (40g). Calculate the moisture percentage of the sample compared.  
.....  
.....  
.....
  - v. State two ways, in which soil moisture is important for crop cultivation.
    - a. ....
    - b. ....
  
2. In a soil analysis, it was found that the following ions contained in the oven dried 100 g of soil.  
Mg<sup>2+</sup> - 4.0 miliequivalents  
Ca<sup>2+</sup> - 8.5 miliequivalents  
K<sup>+</sup> - 3.5 miliequivalents  
Al<sup>3+</sup> - 4.0 miliequivalents
  - i. In this soil sample,
    - a. Calculate the cation exchange capacity  
.....  
.....
    - b. Calculate the amount of base cation.  
.....  
.....

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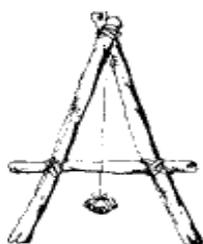
c Calculate the percentage of base saturation

.....  
.....  
.....

i State the importance of cation exchange capacity in crop cultivation.

.....

3. Equipment used in soil conservation is given below



i Name the above equipment .....

i For which activity is this equipment used ?

.....

ii State three materials that are required to prepare the above equipment.

a .....

b .....

c .....

iv Mention three methods of soil conservation affected by using the above equipment.

a .....

b .....

c .....

4. The pictures given below are the equipment used in measuring physical properties of soil and the constituents of soil.



A



B



C



D

i Name A, B, C and D

A. ....

B. ....

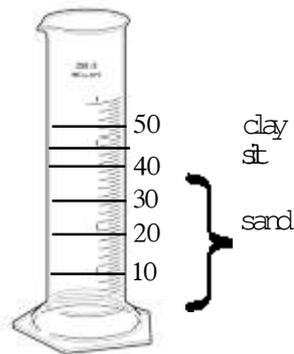
C. ....

D. ....

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- i State the uses of A, B, C and D equipment
  - A. - .....
  - B. - .....
  - C. - .....
  - D. - .....
- ii Name the chemical which should be present in the material in the equipment B  
 .....

5. A student has put a soil sample collected from an agricultural field to a beaker contained water. After that it has been shaken thoroughly and poured into a measuring cylinder labeled in millimeters as shown below. After that it was kept for soil particles to deposit.



- i Calculate the sand, silt, clay percentages in the soil sample.
  - a sand percentage .....
  - b silt percentage .....
  - c clay percentage .....
- i What is the texture class according to the above percentages.  
 .....
- ii State a method that can be use to determine the soil texture in a laboratory .  
 .....
- iv. State two reasons for understanding the importance of soil texture to a crop cultivator .
  - a .....
  - b .....

6. Problematic conditions arise when the soil is salinitzed or become basicity .

- i What is soil basicity?  
 .....  
 .....  
 .....
- i State two differences that can be observed in a basic soil and a saline soil

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**Basic soil**

**Saline soil**

- a .....  
 b .....
- i.** State equipment for each that is used to measure soil salinity and soil basicity
- a Salinity - .....  
 b Basicity - .....
- iv.** Give two reasons for soil salinity .
- a .....  
 b .....
- v.** State the action that can be applied to normalize a basic soil.  
 .....

7. A few processes related to soil and its results are given below . Match X and Y to show the correct connection and write the letter in the given space below .

X	Y
X <sub>1</sub> Transforming Hematite in rocks to Limonite	Y <sub>1</sub> Spherical water drops remain among soil particles.
X <sub>2</sub> Fe <sup>++</sup> is oxidized when the rock is exposed to the air	Y <sub>2</sub> get removed from soil when drainage is good.
X <sub>3</sub> Weak adhesive bonds exist between air and water	Y <sub>3</sub> Can remain in soil in liquid form
X <sub>4</sub> Gravitational water binds to soil particles weakly	Y <sub>4</sub> Ferric oxide becomes hydrous Ferric oxide
X <sub>5</sub> Soil water remains against gravitational force between pF 4.2 - 2.5	Y <sub>5</sub> It is Easy to remove from the rock

- i.** X<sub>1</sub> - .....  
**i** X<sub>2</sub> - .....  
**ii** X<sub>3</sub> - .....  
**iv.** X<sub>4</sub> - .....  
**v.** X<sub>5</sub> - .....

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8. A soil consists mainly of solids, air, water and organisms.  
 i. Show the percentages of soil air and soil water in standard soil .

**percentage**

- a. Soil water - .....
- b. Soil air - .....

- i. State two primary minerals and secondary minerals in a soil.

**Primary minerals**

**Secondary minerals**

- a. .... a .....
- b. .... b. ....

- ii. Categorize soil organisms according to the size of body .

- a. ....
- b. ....
- c. ....

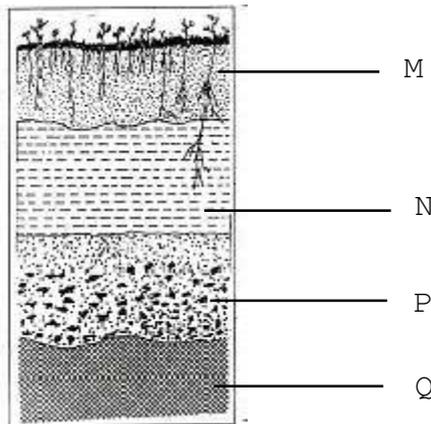
- iv. State two factors that change the composition of soil air .

- a. ....
- b. ....

- v. Categorize soil water based on its physical properties.

- a. ....
- b. ....
- c. ....

9. The diagram of a soil profile is given below .



- i. Name M, N, O and P of the soil profile

- M - .....
- N - .....
- P - .....
- Q - .....

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- ii. Which layer is formed from weathered rock only in the above diagram?  
.....
- i. Which layer provides the basic materials required for soil genesis?  
.....
- iv. In which layer contains humus in the above diagram?  
.....
- v. State the layer where the soil organisms live. Give reasons for this.  
Layer - .....  
Reason - .....

10. A teacher instructed a group of students who study agriculture to find the true density of a soil sample.

- i. The students were instructed to sieve the soil sample taken for the experiment using the 0.25mm sieve. Give reason for this.  
.....  
.....  
.....

i. The students have received the following readings after following the method of finding the true density of the soil sample.

- W eight of the empty bottle = 9 g
- W eight of specific gravity bottle + soil = 15 g
- W eight of specific gravity bottle + soil + water = 24 g
- W eight of specific gravity bottle + water = 20 g

- a. What is the weight of the dry soil?  
.....
- b. What is the weight of water equal to the volume of soil?  
.....  
.....
- c. Calculate the true density of the soil  
.....  
.....

ii. According to the answer, the students had got for the actual density, the teacher has stated that an error had occurred. When the readings were taken. What is the reason for this statement  
.....

iv. Always the actual density is (greater/lesser) than the bulk density.

## 4. Plant nutrients

1. Nutrient deficiency is one of the important factor that af fect the reduction of yield. To avoid nutrient deficiency, that is need to apply fertilizer correctly .
- i. State four reasons that lead to nutrient deficiency in plants.
- a .....  
b .....  
c .....  
d .....
- ii. State the fertilizer that can be used in each of the following nutrient deficiencies in plants
- a Nitrogen deficiency - .....  
b Pottasium deficiency - .....  
c Magnisium deficiency - .....
- i. State the ionization of each of the following fertilizer in each nutrient absorbed by the plants
- a Nitrogen - .....  
b Phosphorous - .....  
c Pottasium - .....  
d Magnesium - .....
- iv. States two advatages and disadvantages of using chemical fertilizer.
- Advantages
- a .....  
b .....
- Disadvantages
- a .....  
b .....
- v. What is the chemical fertilizer that is produced by Ammonia that reacts with Sulphuric acid produced by the Haber process.  
.....
2. In a soil analysis it was found that the following nutrients are available in the soil.
- Pottasium
  - Iron
  - Chlorine
  - Vanadium
  - Magnesium
  - Calcium
  - Silicon
  - Aluminium
  - Nickel
  - Manganus

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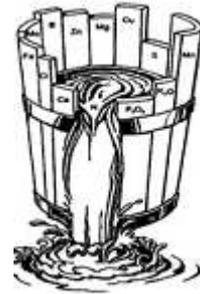
- i From the above elements
  - a State two essential macro nutrients
    - 1. ....
    - 2. ....
  - b State two essential micro nutrients
    - 1. ....
    - 2. ....
  - c State two subsidiary elements
    - 1. ....
    - 2. ....
  - d State two movable elements
    - 1. ....
    - 2. ....
  - e State two immovable elements
    - 1. ....
    - 2. ....
  - f What is the element required for the growth of the leaves and the sheath of the leaf of the paddy plant? .....
  
- 3. There was a farmer who expected to cultivate maize in his field. After a soil test, it was found that there was a deficiency in Nitrogen and Phosphorous. But Potassium was in excess. The pH level of the soil is 4.
  - i State two main problems to developing maize cultivation in this field.
    - a .....
    - b .....
  
  - ii Mention four reagents that can be used to increase the pH value of the soil
    - a .....
    - c .....
    - b .....
    - d .....
  
  - iii State two strategies that can be used to increase the Nitrogen content in the field.
    - a .....
    - b .....
  
  - iv. State two types of inorganic fertilizers which can be added to the phosphorous in the field.
    - a .....
    - b .....

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v. State the Leibig theorem on minimum shown in the diagram.

.....  
.....  
.....  
.....



4. Green leaf manure is an organic fertilizer that can be applied in cultivation.

i. State two types of trees that give leaves for green manure

a ..... b .....

i. State two ways of applying green manure to the field.

a .....

b .....

ii. State four factors that affect the rapid decomposition of green manure

a .....

b .....

c .....

d .....

iv. In addition to improving fertility of the soil, state two advantages of applying green manure.

a .....

b .....

v. State two disadvantages of using green manure

a .....

b .....

5. A farmer in the wet zone has decided to produce compost using waste in this farm.

i. State four methods of producing compost

a ..... b .....

c ..... d .....

i. Which method is the most suitable method for large scale compost production?

.....

ii. State in order, the main steps which should be followed in making compost.

a .....

b .....

c .....

d .....

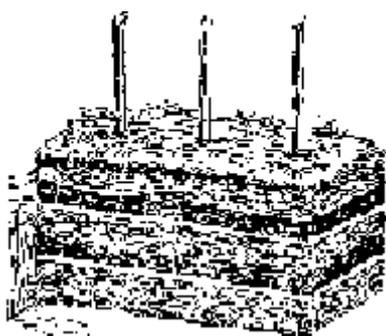
e .....

f .....

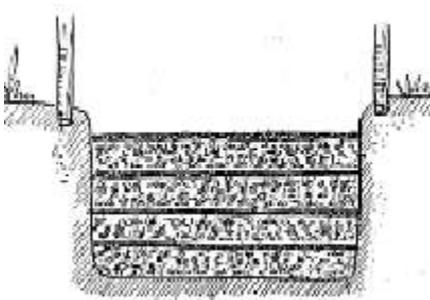
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- iv. State two characteristics that can be observed in quality compost
  - a .....
  - b .....
- v. State two new trends in manufacturing compost.
  - a .....
  - b .....

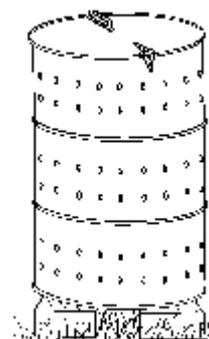
6. (A) The diagrams below are three methods of making organic manure.



P



Q



R

i Name the above A, B and C methods.

P.....

Q. ....

R .....

i Which method do you recommend to a farmer who cultivates 2ha vegetable land in the western province.

.....

Write down the reason for the answer .

.....

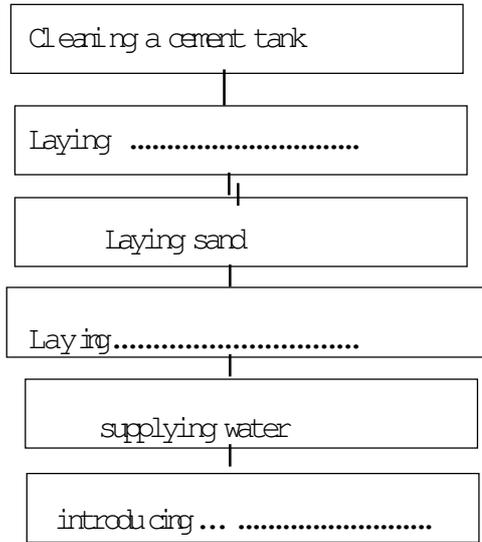
.....

iii. A farmer who practiced P method, got the following observations. State the reason and the solution for each observation.

Observation	Reason	Solution
1. When removing the fixed stick inside the heap, fungi contamination was observed.	.....	.....
2. Take more time for the compost heap to decay	.....	.....
3. An aerated condition can be seen on the surface of the compost heap	.....	.....

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(B) i The following flow diagram shows the steps, in preparing wormi-compost.



- i State two disadvantages of this method.
  - a .....
  - b .....
- ii Other than this method, state two other methods that are used to prepare organic manure.
  - a .....
  - b .....

## 5. Land preparation

1. After ploughing, the following soil attributes can be observed. Underline the correct answer given within the brackets.
  - a. Random roughness ( Increased/ Decreased/ Not changed ).
  - b. Soil bulk density ( Increased/ Decreased/ Not changed ).
  - c. Soil porosity ( Increased/ Decreased/ Not changed ).
  - d. Soil water conductivity ( Increased/ Decreased/ Not changed ).
  - e. Soil particle density ( Increased/ Decreased/ Not changed ).
  - f. Soil texture ( Increased/ Decreased/ Not changed ).
  - g. Soil compaction ( Increased/ Decreased/ Not changed ).
  
2.
  - i. Give the most suitable land preparing method for highly eroded soil.  
.....
  - i. What are the three main steps that should be followed in the above mentioned land preparing method?
    - a. ....
    - b. ....
    - c. ....
  - ii. Give the main disadvantage of the land preparation techniques mentioned in part (i).  
.....
  - iv. What is the method used in preparing land for lowland paddy cultivation?  
.....
  - v. How does this land preparation method differ from other existing methods of land preparation methods.  
.....
  
3. (A) One of the objectives of land preparation is to prevent soil compaction.
  - i. What is soil compaction?  
.....  
.....
  - i. Give the factors which cause soil compaction.
    - a. ....
    - b. ....

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- i Give four main objectives of land preparation.
  - a .....
  - b .....
  - c .....
  - d .....

(B) List two advantages and two disadvantages of **Minimum** tillage.

**Advantages**

- a .....
- b .....

**Disadvantages**

- a .....
- b .....

4. Although zero tillage has advantageous qualities, there are situations where this cannot be practiced.

- i Give two situations where zero tillage cannot be practiced.
  - a .....
  - b .....
- i Give two advantages of **Zero** tillage
  - a .....
  - b .....
- ii Name a weedicide which can be used in zero tillage  
.....
- iv. Give two adverse effects of using of inorganic weedicides in zero tillage
  - a .....
  - b .....

5. Name a suitable land preparation tool for each event given below

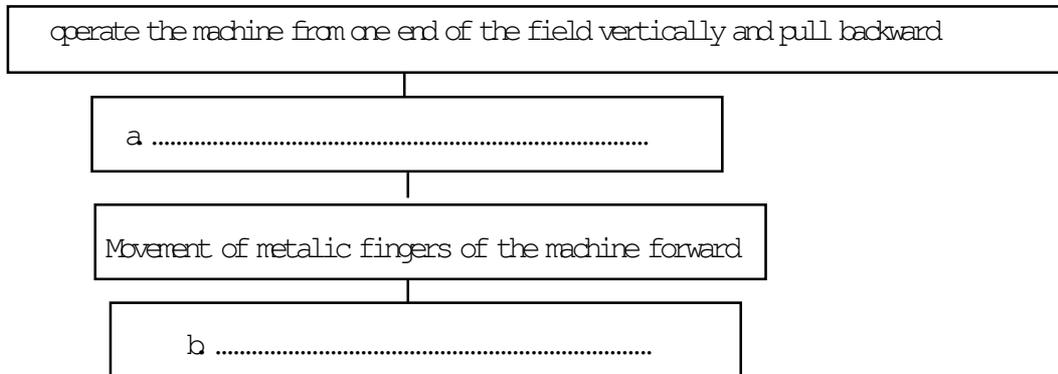
- i A primary tool which is operated using labour .  
.....
- i A secondary tool which can be used in lowland paddy cultivation only .  
.....
- ii A machine that is used for ploughing hardspan were not much stone is present.  
.....
- iv. A type of plough that is operated by a dual blade four wheel tractor .  
.....

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- v. A human powered implement which is used to make shallow trenches in paddy fields  
.....
- vi. A tool which is fixed to the wheel tractor for soil pulverizing.  
.....
- vii. A primary land preparation tool that comprises lines of round blades.  
.....
- viii. An implement that can be used to make ridges on a field  
.....
- xi. A human powered machine that is used for weeding in lowland paddy cultivations  
.....
- x. An implement that is used for weeding, sowing and making ridges in upland paddy cultivations  
.....

6. During the seed germination period, it is important to receive proper rainfall.
- i. Give the adverse effects of late sowing of seeds in seasonal paddy cultivations.
    - a .....
    - b .....
  - i. The most suitable time to initiate seasonal cropping is (before/with onset of/after) the monsoonal rains.
  - ii. Give two advantages of seed sowing
    - a .....
    - b .....

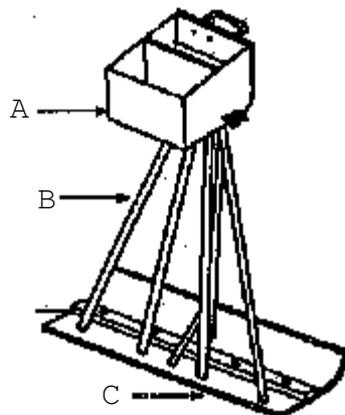
7. Transplanters are commonly used in the paddy cultivation.
- i. Complete the flow chart which illustrates the function of a six row transplanter



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- i. What is the distance between two rows when transplanting using this machine.  
.....
  - ii. State four advantages transplanting along rows.
    - a .....
    - b .....
    - c .....
    - d .....
8. A farmer in the dry zone, has expected to start a chillie cultivation on that land. At the beginning he has been given instructions by the agriculture instructor to prepare a nursery .
- i. State a suitable type of nursery for chillie cultivation.  
.....
  - ii. What are the characteristics to be considered when selecting land for a nursery?
    - a .....
    - b .....
    - c .....
  - iii. Why does a nursery need to be 'sterilized' ?  
.....
  - iv. State two methods of soil sterilizations.
    - a .....
    - b .....
  - v. Give the importance of a nursery for chillie.
    - a .....
    - b .....
9. The illustration given below shows a seed sowing machine.

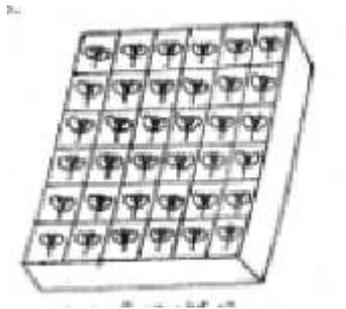


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- i Name the machine .....
- i Name the Components of A, B, and C.
  - A. ....
  - B. ....
  - C. ....
- ii Write the main functions of A, B and C components.
  - A. - .....
  - B. - .....
  - C. - .....
- iv. State two advantages of this machine
  - a .....
  - b .....

10. The Illustration given below is a nursery

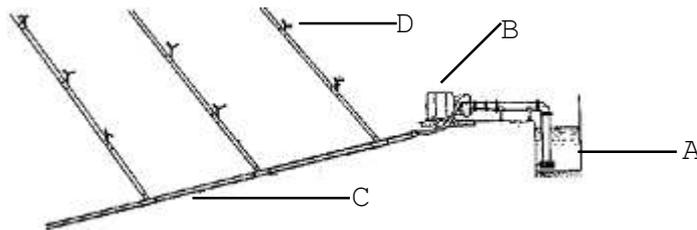


- i Name the nursery given above  
.....
- i State two main ingredients used for preparing the planting medium of the nursery given above
  - a .....
  - b .....
- ii State the most suitable **Family** of plants which can be grown in the nursery given above.  
.....
- iv. State two advantages of the type of nursery given above.
  - a .....
  - b .....

**6. Irrigation and Drainage**

- 1. Water is a primary requirement for a crop.
  - i. State of reasons why water is important a crop.
    - a .....
    - b .....
  - ii. Under which **soil moisture condition** should water be supplied to the above field.  
.....
  - iii. State two main surface irrigation methods.
    - a .....
    - b .....
  - iv. State two main ways of water loss from the soil of the field.
    - a .....
    - b .....
  - v. Give two soil moisture conservation methods.
    - a .....
    - b .....

2. The figure given below shows a drip irrigation system.



- i. Name A, B, C, and D
  - A - .....
  - B - .....
  - C - .....
  - D - .....
- ii. What is the function of B.  
.....

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- ii. List four advantages of sprinkler irrigation.
  - a .....
  - b .....
  - c .....
  - d .....
- iv. If a sprinkler head of the system disperses water throughout an area of 3 m<sup>2</sup>, find the distance between two rows of sprinkler heads.  
.....  
.....

3. The following data were obtained from a chilli field

Total land area of the field	= 0.5 ha
Root zone depth	= 50 cm
Soil bulk density	= 1 gcm <sup>-3</sup>
Moisture content at field capacity	= 30 % (by weight)
Moisture content at permanent wilting point	= 12 % (by weight)
Transpiration	= 15 mm /day
Management allowed depletion level	= 50 %
Crop factor	= 0.8

- i. Estimate the amount of water required for the field as a height.  
.....  
.....  
.....  
.....
- i. Find out the **net water requirement** of the field as a height.  
.....  
.....  
.....  
.....
- ii. Find the time when water should be supplied.  
.....  
.....  
.....
- iv. Find the irrigation frequency. (The amount of water needed to be supplied at a time.)  
.....  
.....  
.....

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4. It was guessed that a part of the crop field of a farmer has very poor drainage.
- i Briefly explain an experiment which can be done to test whether the soil drainage of a given field is poor or not.  
.....  
.....  
.....
  - i State two reasons that cause poor drainage soil.
    - a .....
    - b .....
  - ii State four adverse effects of poorly drained soil.
    - a .....
    - b .....
    - c .....
    - d .....
  - iv. State two crops that are tolerant of poorly drained soil.
    - a .....
    - b .....
5. The problems will occur when cultivation done under poor drainage conditions. To prevent this, a proper drainage system should be planned.
- i State two factors that should be considered in designing a drainage system.
    - a .....
    - b .....
  - i State four main drainage methods.
    - a .....
    - b .....
    - c .....
    - d .....
  - ii State four main drainage systems needed to develop drainage of soil.
    - a ..... b .....
    - c ..... d .....
  - iv. State four advantages of improved drainage of the soil of the field.
    - a .....
    - b .....
    - c .....
    - d .....

## 7. Plant propagation

1. 1. Use "✓" for correct statements and "X" for incorrect statements

Statement	✓	X
i. Selection based on environmental variation can be used to obtain new plants	.....	.....
ii. Triploid plants produce a large number of small seeds	.....	.....
i. There is a direct relationship between the moisture content of the seeds and seed viability	.....	.....
iv. Genetic variation can be seen in sexually propagated plants	.....	.....
v. Growth of hypocotyl is faster in epigeal germination	.....	.....

2. (A) Write the most suitable seed-dormancy-breaking method for of the following seeds

Seed	Seed-dormancy-breaking method
i. Teak	.....
ii. Mango	.....
iii. Lettuce	.....
iv. Paddy	.....
v. Bitter gourd	.....

- (B) Write the standards of certified seeds of paddy in Sri Lanka.

- i. Moisture content .....  
ii. Germination percentage .....  
iii. Weed-seed percentage .....  
iv. Other crop-seed percentage .....

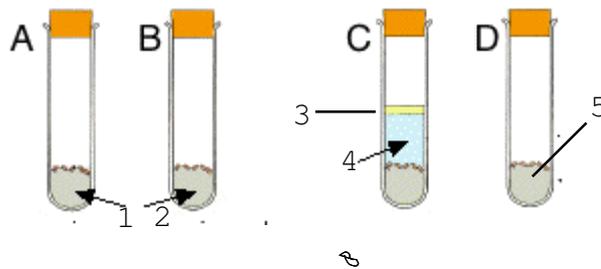
3. Almost always, vegetable and cereal crops are propagated with seeds. Curry-chillies, tomato, finger-millet, snake-gourd, ridge-gourd, okra, rice and corn (maize) are a few examples of these.

- i. Classify the above crops as monocotyledonous and dicotyledonous.  
a. Monocotyledonous .....  
b. Dicotyledonous .....

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- i. In which group in above 3 (i), is hypogeal germination seen?  
.....
- ii. Seed dormancy of tomato seeds is caused by growth inhibitors. State a method to remove seed dormancy in tomato seeds.  
.....
- iv. State two more reasons for seed dormancy .
  - a .....
    - b .....
- v. State two advantages of plant propagation through seeds.
  - a .....
  - b .....

4. Given below is an experiment for testing factors required for seed germination



- i. Name 1 to 5
  - 1. - .....
  - 2. - .....
  - 3. - .....
  - 4. - .....
  - 5. - .....
- ii. State the places where A, B, C and D test tubes must be placed.
  - A - .....
  - B - .....
  - C - .....
  - D - .....
- iii. What are the possible observations on test tubes A, B, C and D after a few days?
  - A - .....
  - B - .....
  - C - .....
  - D - .....
- iv. What is your conclusion according to the observations?  
.....  
.....

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- v. If 180 seeds were germinated out of 200-seed sample, calculate the seed germination percentage of the seed sample.

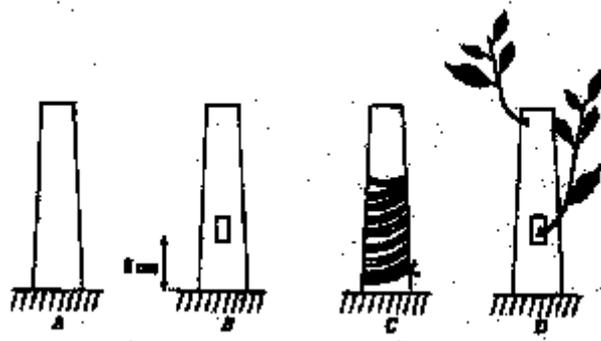
.....

.....

.....

.....

5. The following figure shows the way of carrying out a patch-budding for a mango plant by a student.



- i. Write a mistake that can be seen in Figure A  
.....
- ii. Write a mistake that can be seen in Figure B  
.....
- iii. Write a mistake that can be seen in Figure C  
.....
- iv. Write a mistake that can be seen in Figure D  
.....

6. i. Write the reason for seed dormancy of the following seeds. State a seed treatment method for each

Seed	Reason for seed dormancy	Seed treatment method
a. Mango	.....	.....
b. Anthurium	.....	.....
c. Bitter gourd	.....	.....
d. Tamarind	.....	.....
e. Teak	.....	.....

- i. The scion is Vellai Collomban and the root stock is a local cultivar in budding Mango for the wet zone in Sri Lanka.
- a. Give the reason for selecting a local cultivar as the root stock  
.....

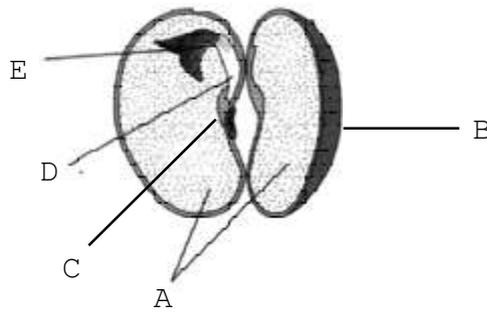
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- b. State two reasons why Vellai Colmban was selected as the scion
1. ....
  2. ....

- i. The following table shows the basic setting up of a tissue culture laboratory. State the most important activity that should be done in each area and mention one instrument important for each activity

Structural unit of the tissue culture laboratory	Activity	Instrument
a. Cleaning room	.....	.....
	.....	.....
b. Preparation room for medium	.....	.....
	.....	.....
c. Inoculation room	.....	.....
	.....	.....
d. Propagating room	.....	.....
	.....	.....

7. The following figure shows a diagram of a dicotyledonous seed



- i. Name the parts of A, B, C, D and E
- A - .....
- B - .....
- C - .....
- D - .....
- E - .....
- i. Mention the functions of A, B and C
- A - .....
- B - .....
- C - .....
- i. What is the type of germination of dicotyledonous plants?
- .....

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iv. State two examples of monocotyledonous and dicotyledonous seeds.

a Monocotyledonous seeds -

1. .... 2 .....

b Dicotyledonous seeds

1. .... 2 .....

v. Mention two differences between monocotyledonous and dicotyledonous plants

	Dicotyledonous plants	Monocotyledonous plants
a	..... .....	..... .....
b	..... .....	..... .....

8. Seeds needed for cultivation, must be examined for high-quality before germination. For this, seed samples must be sent to a seed testing laboratory.

i i What are the four characteristics of seeds which are suitable for cultivation?

- a .....
- b .....
- c .....
- d .....

i Describe the following samples.

- a Primary sample:  
.....  
.....
- b Composite sample:  
.....  
.....
- c Submitted sample:  
.....  
.....

ii Measuring seed germination percentage is one of the experiments in seed testing. State three methods for testing seed germination percentage.

- a ..... b .....
- c .....

iv. If 175 seeds are germinated from a sample of 250 seeds, calculate the germination percentage of the seed sample.

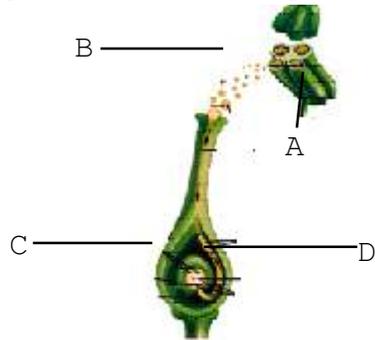
.....  
.....  
.....

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9. Pineapple and banana can be propagated using suckers.
- i Define 'suckers'.  
.....  
.....
  - i a. State two types of suckers in pineapple plants.  
1 ..... 2 .....
  - b State the most suitable type of sucker from the above two.  
.....
  - ii Mention a pre-treatment method which can be used before planting pineapple suckers.  
.....
  - iv. What is the most suitable type of suckers in growing banana for cultivation?  
.....
10. A. Write the situation where the following instruments and chemicals used in plant propagation
- a Tetrasolium Chloride - .....
  - b Trier probe - .....
  - c Budding strip - .....
  - d Indole acetic acid - .....

B. The following figure shows the method of pollination and fertilization of a flower .

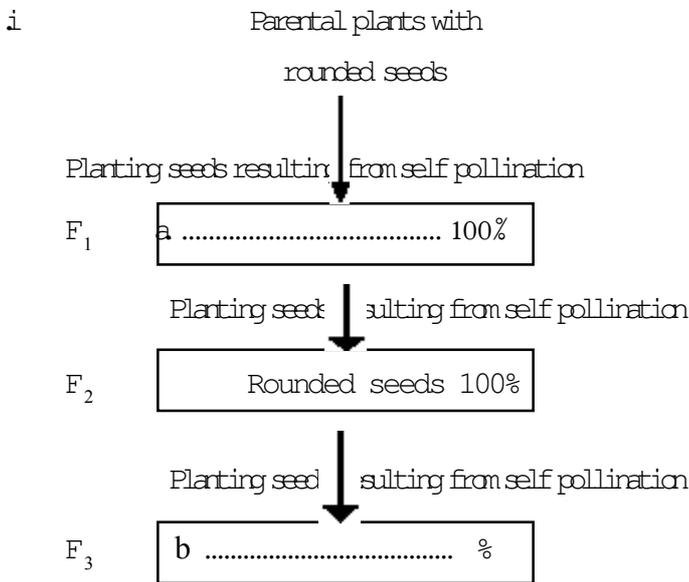


- i Name parts of A, B, C and D.  
A - .....  
B - .....  
C - .....  
D - .....
- i Write the name given to following parts of a flower after fertilization.  
a Integument - .....  
b Ovary - .....  
c Ovary wall - .....  
d Ovum - .....

**8. Plant Breeding**

- 1. Inheritance and environment are considered the main factors in controlling characteristics of an organism
  - i. Define inheritance  
.....  
.....
  - i. Define genetics  
.....  
.....
  - ii. Mention three factors that were considered by an Austrian priest and Gregory Mendel in describing characteristics of inheritance of garden pea.
    - a. ....
    - b. ....
    - c. ....
  - iv. Mendel used pure lines for his experiments. Define "Pure lines"  
.....  
.....

2. Select suitable words for the blanks



- i. Inherited Characteristics of organisms are decided by  
.....
- ii. A couple of chromosomes where the length, shape and position of the centromere are the same is called ..... chromosomes.
- iii. A gene consists of two .....

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3. The genetic constitution of a plant height is changed as Tt and TT. The phenotype of the plant is tall
- i. Define phenotype  
.....  
.....
  - ii. Define genotype  
.....  
.....
  - iii. In a plant, red flowers are dominant (R) and white flowers are recessive (r). Write the genotype of the progeny that resulted from the cross of Rr X Rr  
.....  
.....
  - iv. Red flowered plants were allowed self pollination through a few generations. In all the generations plants produced only red flowers. Give a name for this type of progeny.  
.....
  - v. What is the probability of having a heterozygous genotype, when a homozygous dominant plant is crossed with a homozygous recessive plant?  
.....

4. A. A In a true-breeding organism, the gene responsible for a characteristic has similar alleles: two dominant alleles or two recessive alleles
- i. Define the following allele
    - a. Dominant allele  
.....  
.....
    - b. Recessive allele  
.....  
.....
  - i. Two pure line plants with dominant and recessive alleles such as floral colours are R and r were cross pollinated (RR X rr).  
Write the genotypes and phenotype of the progeny that resulted from the self pollination of the F1

	Genotype	Phenotype
a. Homozygous dominant	.....	.....
b. Heterozygous dominant	.....	.....
c. Homozygous recessive	.....	.....

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**ii** A purple-flowered plant from a pure line was crossed with a white flowered pure line plant. Find out the portion of genotypes and phenotypes of the F<sub>2</sub> plants that resulted from crossing between F<sub>1</sub> plants.

.....  
.....

5. (A). **i** Write Mendel's First Law of Genetics (Law of Segregation).

.....  
.....

**i** Define mono-hybrid cross and di-hybrid cross

mono-hybrid cross - .....

.....

di-hybrid cross - .....

.....

(B). Mendel's second law was forwarded considering pattern of inheritance of two genes

**i** Write Mendel's second law

.....  
.....

**i** State another form of this theory.

.....

6. (A). Mendel did a test cross to examine the accuracy of his hypothesis.

**i** Define Test cross

.....  
.....

**i** State the process of test-cross.

.....  
.....

**iii** Purple flowered and hairy stem pea plant was crossed with red-flowered, smooth-stemmed pea plant. All F<sub>1</sub> plants were purple flowered and hairy stemmed. A cross between F<sub>1</sub> plants gave the progeny below.

Purple, hairy	:	purple smooth	:	red hairy	:	red smooth
550	:	190	:	185	:	65

**a** Write the genotype of F<sub>1</sub>

.....  
.....  
.....

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b Write the expected phenotype of the above results

.....

c What is your view on the above results?

.....

.....

7. The desired traits are selected from a population in a breeding program.

i Define the variation

.....

.....

ii Write 4 objectives of the breeding

a .....

b. ....

c .....

d. ....

iii Write three methods of creating genetic variation

a ..... b .....

c .....

iv. Breeding process is done until the relative characteristics take a higher level during several generations. Name this process.

.....

v. What are the breeding methods of the organism?

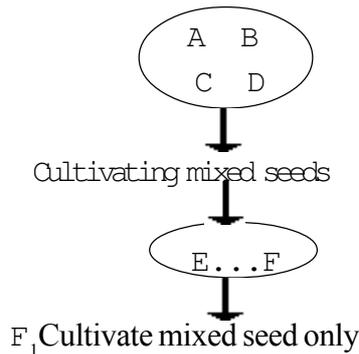
a .....

b .....

vi. It is found that, when wheat plants were allowed to inbreed, the size of the plants became small and the yield was reduced. Give reason for this.

.....

8. In a population with different variations, Seeds of the plants (A, B, C, D) with desired characteristics were selected and were blended. Seeds of the plants with the desired characteristics were selected in the next generation and were planted again after blending. This was done continuously for the expected characteristic.



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- i Write the name of the breeding method  
.....
- i State an advantage and a disadvantage of this method of breeding  
Advantage  
.....  
Disadvantage  
.....
- ii Defines Cross breeding.  
.....  
.....
- iv. Write two examples for the use of cross breeding in favor of agriculture
  - a .....
  - b .....
- v. A progeny of a cross breeding, exhibits superior characteristics than that of their parents. What is the condition associated in this?  
.....

9. Underline the correct answer

- i a Hybrid vigor is (increased/ decreased) from generation to generation.
  - b In inbreeding, (homozygosity/heterozygosity) of the gene loci is gradually increased
  - c In general crop plants gametes are (monoploid/diploid) while somatic cells are (monoploid/diploid).
  - d Fertile seeds (can be/can't be seen) in triploid plants
  - e A gene (can/can't) replicate autonomously
- 
- i Joining together of DNA molecules (or genes) of two different species and inserting them into a host organism to produce new genetic combinations that are of value to science, medicine, agriculture, and industry is called recombinant DNA technology
    - 1. Name three organisms that can be used as a vector
      - a .....
      - b .....
    - 2. Define gene cloning  
.....  
.....
  - ii What is the importance of the gene cloning?  
.....

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- iv. Write the steps of recombinant DNA technology in order .
  - a .....
  - b .....
  - c .....
  - d .....
  - e .....
  - f .....
  - g .....
- v. What are the disadvantages of recombinant DNA technology  
.....
- vi. Write three examples of the usage of recombinant DNA technology
  - a .....
  - b .....
  - c .....

10. The Organisms that lack adaptations to the environment are naturally destroyed.

- i. Define genome  
.....  
.....
- i. Define gene pool  
.....  
.....
- ii. Define genetic resources conservation  
.....  
.....
- iv. State 4 human activities effect destruction of genetic resources
  - a .....
  - b .....
  - c .....
  - d .....
- v. Write down three human activities that affect to destruction of gene resources.
  - a .....
  - b .....
  - c .....

11. i. Name the report which contains data on endangered species and the organization it was published by.

Name of the report .....

Organization .....

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- i. What is the condition of the threatening level given as "ruined"?  
.....
- ii. Propose a method of plant conservation that can be used with plants at risk of 'ruin'  
.....
- iv. Explain 3 factors important to plant genetic resource conservation
  - a .....
  - b .....
  - c .....
- v. Write examples of the places of *In-situ* gene conservation of Sri Lanka
  - a .....
  - b .....
  - c .....
- vi. Write two advantages of using genetic resources
  - a .....
  - b .....
- vii. In which country is the world gene conservation center of rice located?  
.....

**09. Crop cultivation under controlled conditions**

1. A. Controlling the condition of the environment in crop cultivation is a popular method as it helps to increase the quality and quantity of the harvest.
  - i. Name this cultivation method .....
  - i. State three environmental conditions that can be controlled in this cultivation method
    - a .....
    - b .....
    - c .....
  - ii. Mulching is used as a method to control soil environmental conditions. State three significances of mulching.
    - a .....
    - b .....
    - c .....
  - iv. State two types of environmentally friendly materials that can be used as mulches
    - a .....
    - b .....
  
2. Different plant propagators are used in controlling environmental conditions in crop cultivation under controlled environmental conditions
  - i. Describe the structure of the temporary propagators  
.....  
.....
  - i. Name three temporary plant propagators
    - a .....
    - b .....
    - c .....
  - ii. State three disadvantages of using poly-tunnels as a protected houses
    - a .....
    - b .....
    - c .....
  - iv. Name two crops more suitable to be grown in protected houses
    - a .....
    - b .....
  - v. Under the Climatic conditions of Sri Lanka what are the most suitable agro-climatic zones for crop cultivation in protected houses.
    - a .....
    - b .....



- (B). According to the Different structures used in crop cultivation under controlled conditions
- i. State the environmental factor that is controlled by each propagator given below.
    - a. Greenhouse - .....
    - b. Lath houses - .....
    - c. Rope houses - .....
    - d. Net houses - .....
  - i. More environmental factors can be controlled in Green Houses. But it is not popular in Sri Lanka. State the reason for this  
.....
  - ii. State two agricultural practices in which green houses are used
    - a. ....
    - b. ....
  - iv. State two strategies that can applied to overcome certain problematic conditions that arise in a greenhouse.
    - a. ....
    - b. ....
    - c. ....
    - d. ....
  - v. State two factors to be considered when propagator structures are used in crop cultivation
    - a. ....
    - b. ....

5. (A). When soil is a limited factor in agricultural activities, the soilless methods can be used
- i. Introduce soilless culture  
.....  
.....
  - i. State how plant nutrients are provided in soilless culture  
.....
  - ii. Classify methods of soilless culture according to the potting media used.
    - a. ....
    - b. ....
    - c. ....

- (B). The following characteristics were identified in the cultivation method
- Nutrient medium is allowed to flow through a shallow groove along a slope
  - The plant in the medium of a small pot is kept in the middle of the groove and the edges of the groove are prepared as a triangular tube

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- i Identify this cultivation method  
.....
  - i State two special features of the above cultivation method  
.....
  - ii State two factors where the soil becomes a limiting factor
    - a .....
    - b .....
6. (A). The Medium supplied for root growth is limited in soilless culture. Therefore, it is essential to provide all nutrients externally
- i Name three macro nutrients required for plant growth as it is not supplied through water and air
    - a ..... b .....
    - c .....
  - i Urea cannot be used for hydroponics. State the reason for this  
.....
  - ii In soilless cultivation, it is required to maintain a nutrient provision programme. State two factors to be considered in relation to the nutrient solutions
    - a .....
    - b .....
- (B). In soilless cultivation with a solid medium, planting structure varies according to the planting medium
- i Name four factors need to be considered when selecting a solid medium for a soilless culture
    - a .....
    - b .....
    - c .....
    - d .....
  - i According to the categorization given below, state an example for each solid medium.
    - a Inorganic natural medium - .....
    - b Inorganic natural solid medium - .....
    - c Inorganic artificial medium - .....
    - d Organic artificial medium - .....
  - ii State two specific characteristics in the structure used for grow bag cultivation
    - a .....
    - b .....



## 10. Plant physiology

1. a Organic compounds are formed as the stable products of photosynthesis. State two types of plants categorization according to the produced compound. Give one example of each category.

Category	Examples
a .....	.....
b .....	.....

- i State the equation for photosynthesis  
.....
- ii List three products of light reaction in photosynthesis
- |         |         |
|---------|---------|
| a ..... | b ..... |
| c ..... |         |
- iv. Name the place where dark reaction of photosynthesis occurs  
.....
- v. Select the crops that give maximum photosynthetic efficiency in the following climatic region
- Maize, Sugar cane, Carrot, Beat
- |                                    |       |
|------------------------------------|-------|
| a Cold climatic (Temperate) region | ..... |
| b Tropical region                  | ..... |

2. In certain situations in agriculture activities respiration rates need to be increased.

- i State two such situations
- |         |  |
|---------|--|
| a ..... |  |
| b ..... |  |
- ii Which factor influences on the above task?  
.....
- iii Name a strategy that can be used to carry out the task successfully.  
.....
- iv. Mention two external factors that affect the rate of respiration
- |         |  |
|---------|--|
| a ..... |  |
| b ..... |  |

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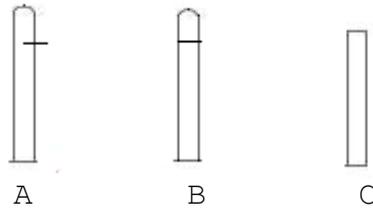
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3. Various means are used in agriculture to make the photosynthesis process efficient.
- i. Name the factor that has to be handled to make photosynthesis efficient in the following instances
    - a. Planting with space - .....
    - b. Pruning - .....
    - c. Using polytunnels in Nuwaraeliya - .....
    - d. Water Supply - .....
  - i. Name three external factors that affect photosynthesis
    - a. ....
    - b. ....
    - c. ....
  - ii. State two internal factors that affect the efficiency of photosynthesis
    - a. ....
    - b. ....
4. Respiration is a process of breaking down the organic compounds by a sequence of enzymatic reactions to get energy.
- i. Name the substrate for respiration  
.....
  - i. Name three main steps of the respiratory mechanism
    - a. ....
    - b. ....
    - c. ....
  - ii. Pyruvic acid  $\longrightarrow$  Ethanol + CO<sub>2</sub>  
  
Name the above process. ....
  - iv. State two plant adaptations to absorb oxygen in aquatic environments with less oxygen concentrations or muddy environments
    - a. ....
    - b. ....
  - v. Explain Lactic acid fermentation  
.....  
.....
  - vi. Name five industries that use anaerobic respiration
    - a. ....
    - b. ....
    - c. ....
    - d. ....
    - e. ....

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5. A few activities of an experiment prepared to test cell elongation are given below



- A - Make a half cut below the apical bud and insert a small plastic chip
- B - Place a block of a chemical compound that contains agar on the apical bud from which the apex is removed.
- C - Keep without applying any treatment to apical bud from which the apex is removed.

i. State possible observations of the above A, B, C specimens

- A - .....
- B - .....
- C - .....

i. State the reason for your observation 'A'

.....

ii. Name the bio-chemical compound important for the above reaction

.....

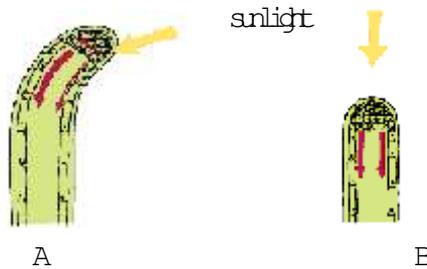
iv. Name two commercially used compounds with functions similar to the above compound

- a .....
- b .....

v. State reasons for observations of B and C

- B - .....
- C - .....

6. The illustration shows the experiment on photoperiodism of plant. A and B are two Coleoptiles of monocotyledonous plants.



i. State the observation of experiment 'A'

.....

i. State the observation of experiment 'B'

.....

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- iii. State the reason for the observation in 'A'
 

.....
- iv. Identify the plant movement type of the above.
 

.....
- v. State an instance that is unfavourable in crop cultivation.
 

.....

7. A student who planted a few Chilli plants
- (1) removed the apical bud of one plant.
  - (2) The apex of the second plant was removed and a block of agar was placed on it.
  - (3) Auxins containing Agar was placed on the removed apex of the third plant.
  - (4) Nothing was done to the remaining plant.

i. State observation of plants 1 – 4 and give reasons for this.

Plant No.		Observation	Reason
1.	The apex removed plant	..... .....	..... .....
2.	The apex was removed and a block of Agar is placed	..... .....	..... .....
3.	Auxin containing a block of agar is placed on the apex removed apical bud.	..... .....	..... .....
4.	Untreated plant.	..... .....	..... .....

- i. According to the above experiment, what is the conclusion drawn by the student?
 

.....

.....
- ii. What is the term used for the above process?
 

.....
- iv. Name two artificial hormones used in horticulture to induce rooting of stem cuttings.
  - a .....
    - b .....

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8. It has been found that Abscisic acid, a plant hormone, mainly functions as an inhibitor while acting as an inducer as well.

i List two (02) main functions of Abscisic acid

a .....

b .....

i Underline the correct answer from within the brackets to complete the answer .

a Biological synthesis of Abscisic acid occurs mainly in (chloroplasts/seeds)

b Auxins translocate from (top to bottom/bottom to top)

c Abscisic acid translocates from (top to bottom/from bottom to top/ on both sides)

d Plant hormones translocate through (Xylem tissues only/Phloem tissues only/both xylem and phloem)

ii State two uses of auxins in Agriculture.

a .....

b .....

ii Name two types of hormones used in tissue culture

a ..... b .....

9. The organic foods produced in photosynthesis are deposited in different plant tissues which grow rapidly .

i Name three different parts where these foods are deposited.

a ..... b .....

c .....

i What is the process of translocation of food produced in the plant leaves to growing parts of plant.

.....

ii Name organic food translocation tissue and two types of structures of same.

Tissue - .....

Structures - 1. ....

2. ....

iv. Define photosynthesis

.....

.....

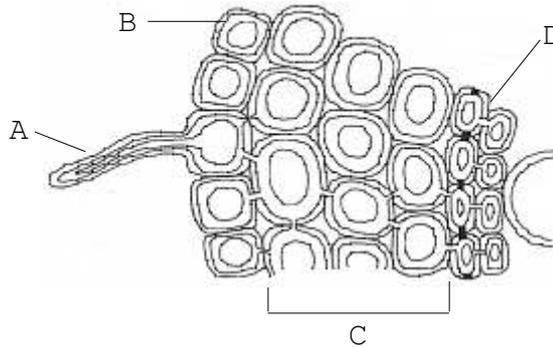
.....

v. State the equation for the chemical reaction of the photosynthesis process.

.....

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10. The diagram given below shows the radial water transportation in a plant root.



i Name A, B, C and D parts

- A - .....
- B - .....
- C - .....
- D - .....

i State two main methods by which materials are absorbed into the plant

- a .....
- b .....

ii What is known as the Casparian strip?

.....  
.....

iv. What is ascent of sap?

.....  
.....

11. Pests control

1. A Farmer observed that his paddy cultivation is damaged by pests. He noticed the following pests when he examined it thoroughly.

- Yellow stem borer
- Paddy bug
- Snail
- Brown plant hopper

i From the above pests,

a State the pests that have complete metamorphosis.

.....

b State the pests that have incomplete metamorphosis.

.....

i State the stage of the life cycle of each pest that damages most.

Pest	The stage of damaging
a Yellow stem borer	.....
b Paddy bug	.....
c Snail	.....
d Brown plant hopper	.....

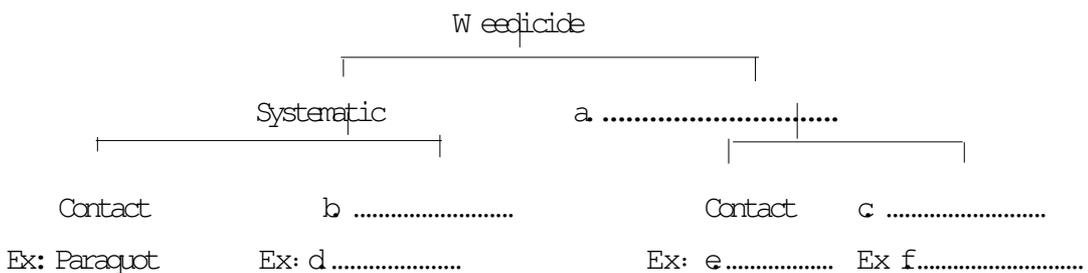
ii He wanted to apply pesticides to control pests. State two types of pesticides (based on physical qualities) that can be bought by the farmer .

- a .....
- b .....

iv. State four types of damage that occur in the environment due to the application of pesticide.

- a .....
- b .....
- c .....
- d .....

2. (A). Fill in the blanks in the following chart.



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(B). State two factors that should be considered when selecting weedicide to a field of cultivated field.

- a .....
- b .....

3. The following diagram shows a plant that is affected by a disease.



- i State the symptom of the disease depicted in the picture.  
.....
- i State the disease that has affected the plant.  
.....
- ii State two characteristics that can be observed in aerial parts of the diseased plant.
  - a .....
  - b .....
- iv. State the procedure that can be adapted to prevent the disease stated in the above.  
.....
- v. Draw the disease triangle.

4. The following are some weeds that are observed in the vegetable cultivation of a farmer .

- |                     |              |             |
|---------------------|--------------|-------------|
| ● Batadella         | ● Thunhiriya | ● Pitawakka |
| ● Wel maruk         | ● Apala      | ● Gandapana |
| ● Kmbul mukunuwenna | ● Kockmota   | ● Kaladhuru |

- i From the above weeds, select and write,
  - a Two types of grasses
    - a .....
    - b .....

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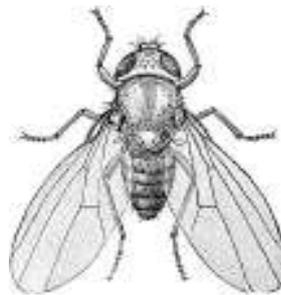
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- b Two types of sedges
  - a .....
  - b .....
- c Two types of broad leaves
  - a .....
  - b .....
- d Two invasive weeds
  - a .....
  - b .....
- i To control 'Kalanduru', the most suitable weedicide is systematic weedicide.  
.....  
.....
- ii State four issues that arise due the weeds in the field.
  - a .....
  - b .....
  - c .....
  - d .....

5. The pictures given below A and B show two types of insect pests in a crop cultivation.



A



B

- i Name A and B.
  - A - .....
  - B - .....
- i State a crop that each pest damages.
  - A - .....
  - B - .....
- ii State the classes of A and B.
  - A - .....
  - B - .....
- iv. State the type of metamorphosis of A and B.
  - A - .....
  - B - .....
- v. State the damage done by A and B to the crops.
  - A - .....
  - B - .....

**12. Post harvest technology**

1. i (l) State one maturity index for the following agricultural crops.

Agriculture crop	Maturity index
a Beans	.....
b Loofa	.....
c Banana	.....
d Mangostine	.....
e Durian	.....

ii State two features in pineapples at the stage of harvesting.

- a .....
- b .....

iii. In some vegetables, the growth is continuing even after they are plucked. Write an example of each of the following crops.

Example

- a Germination - .....
- b Rooting - .....
- c Elongation - .....
- d Germination within the pod - .....

iv The main reason for post harvest losses is microbial activities. State the main groups of microbes affecting them

- a .....
- b .....

2. (A) i What is meant by post harvest losses

.....  
.....  
.....  
.....

i. State three important factors of post harvest technology

- a .....
- b .....
- c .....

(B) i Harvests are divided into two, according to this nature of them. Name them.

- a .....
- b .....

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- ii. According to the changes that take place during the post harvest period, fruits are divided into two categories. Name them.
  - a .....
  - b .....
- i. Compare the main differences of these two categories
  - a
  - b
  - 1. ....
  - 2. ....
  - 3. ....
- iv. Give two examples of each category .
  - a .....
  - b .....

(C) i. Write two external and internal factors each that affect the post harvest losses.

Internal factors

External factors

- a .....
- b .....

ii. State two pre-harvesting factors that affect post harvest losses.

- a .....
- b .....

iii. After harvesting the crop gets damaged at different stages. State four such stages.

- a .....
- b .....
- c .....
- d .....

3. (A) i. The harvest of paddy has to be processed before sending it to the market. State four main steps in the processing of paddy harvest.

- a .....
- b .....
- c .....
- d .....

ii. How do you minimize the post harvest losses by par-boiling.

.....  
.....  
.....

i. State three benefits of the par-boiling process of paddy .

- a .....
- b .....
- c .....

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- iv. What is the minimum moisture content of dried paddy for storage.  
.....
- v. What are the procedures that should be adopted before storing paddy in the storage?
  - a .....
  - b .....
  - c .....
  - d .....
- vi. There are two ways of packing paddy bags. State these two methods.
  - a .....
  - c .....

(B) After cleaning the harvest the next step is grading the crop.

- i. What is meant by grading the crop.  
.....  
.....
- ii. Write two advantages of grading the crop.
  - a .....
  - b .....
- i. State two ways of grading the crop.
  - a .....
  - b .....

(C) i. List the benefits of packing the crop methodically .

- a .....
- b .....
- c .....
- d .....

ii. Packaging materials used in the crop packing are of three types according to their physical condition. Name these categories and give two examples of each.

Packaging material	Example
a .....	1. .... 2. ....
b .....	1. .... 2. ....
b .....	1. .... 2. ....

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- i. State three characteristics of the food packaging process.
  - a .....
  - b .....
  - c .....
- iv. Polyethylene which is commonly used as packaging material is of two forms. Mention the two types.
  - a .....
  - b .....

4. (A) The main disease agents of post harvest diseases are Fungi and bacteria.

- i. State two ways in which these disease agents enter the crop.
  - a .....
  - b .....

i



- a Which disease is indicated in the above diagram?  
.....
- b Which category of microbes creates this condition in the disease above ?  
.....
- c What is the treatment that can be applied to control this condition of the disease?  
the treatment - .....  
the procedure of the treatment - .....

(B) Harvesting the crop on time is very important to minimize post-harvest losses.

- i. State the most appropriate time for harvesting the following crops.

<b>Crop harvest</b>	<b>Suitable time for harvesting</b>
a Vegetable crops	.....
b Green leaves	.....
c Banana	.....
d Mango	.....
e Orange	.....

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- ii. State two main methods of harvesting
  - 1. ....
  - 2. ....
- iii. Write two types for the each conventional and modern packaging material used in packaging the harvested crop at the field before bringing it out.
  - Conventional packaging material
    - 1. ....
    - 2. ....
  - Modern packaging material
    - 1. ....
    - 2. ....

5. Answer the following questions after studying the table given below.

Vegetable fruit	Temperature (°C)	Relative Humidity (%)	Self life (Days)
Banana	12-13	80-85	30
Bitter fruit	5-12	80-85	20-28
Grapes	32	85	56-180
Orange	4-8	85-90	28-56
Ladies fingers	7-10	90-95	7-14
Pumpkin	10-16	50-75	84-160
Brinjal	8-13	90-95	10-14

- i. How do you control the above parameters to preserve fruits and vegetables.
  - a.....
  - b.....
- ii. What is the common relative humidity range for the fruits that can be stored for a long period.
 

.....
- iii. Why is high temperature used in storing grapes in relation to other fruits.
 

.....
- iv. What is the suitable temperature range for storing fruits and the vegetables used in day to day life.
 

.....
- v. Even in a refrigerator, vegetables such as Ladies fingers and beans can be stored for a short period only. State the reason for this.
 

.....

**13. Home gardening and paddy cultivation**

1. In home gardening a quality harvest can be obtained by adopting integrated agriculture such as beneficial cultivation methods, natural inputs and protecting the yield.
- i. State two factors needed to be considered when selecting crops to get a quality harvest from home gardening.
    - a. ....
    - b. ....
  - ii. State three agronomic pest control methods used to protect the yield of home grown crops.
    - a. ....
    - b. ....
    - c. ....
  - iii. State three alternative pesticides that can be used to control the home garden.
    - a. .... b. ....
    - c. ....
  - iv. State three strategies that can be used to attract insectivorous birds to the field.
    - a. ....
    - b. ....
  - v. Name three predators of insect pests in home gardens.
    - a. ....
    - b. ....
    - c. ....
2. A student has marked the number of light hours and relevant places in a home garden plan. According to the following information received.

Place	Received light hours
A	6 – 8 hours
B	4 – 6 hours
C	2 – 4 hours

- i. i. State a suitable crop or a class of crops for each of the above place A, B C
  - A- .....
  - B- .....
  - C- .....

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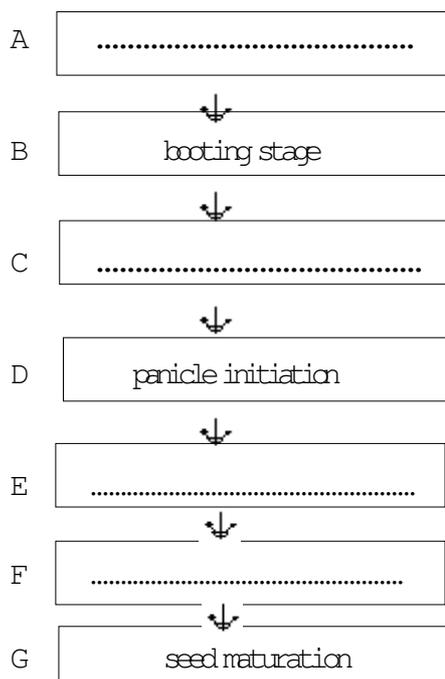
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- i State three examples of cultivation methods which can be practiced in a home garden with a limited soil environment.
- a ..... b .....
- c .....
- ii State three strategies of water conservation that can be applied in a home garden
- a .....
- b .....
- c .....
- d .....

3. Recently greater attention has been paid to insect pests in paddy cultivations.

- i State the order of the following insect pests
- The Order
- a *Nilaparvata lugens* – Brown plant hopper .....
- b *Leptocorisa oratorius* – Paddy Bug .....
- c *Scirpophaga incertulas* – Yellow stem borer .....
- ii State three insect predators that are helpful in pest control in paddy cultivation
- a ..... b .....
- iii Name three place where the damage caused by rice field rats can be seen.
- a ..... b .....
- iv. At which stage is the damage caused by rodents very common.
- .....

4. (A) The stages in the life cycle of a rice plant is shown below .



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- i. State the main growth stage of the rice plant represented in the above diagram  
.....
- i. Name the stages of A, C, E and F  
A- .....  
C - .....  
E- .....  
F- .....
- ii. At which stage is the damage by paddy bug common?  
.....
- iv. State the characteristic that is displayed in stage 'D' ?  
.....
5. The farmer sought the assistance from an Agriculture Instructor to cultivate a newly bought paddy field. On that occasion the Agriculture instructor has provided the following instructions to the farmer .
- Cultivate the three months paddy variety in the paddy field.
  - Use parachute method for plant establishment
  - Use integrated pest control methods
- i. a. If the farmer is getting ready to cultivate in the Maha season in which month has he has to do the land preparation?  
.....
- b. State two paddy varieties that can be cultivated.  
1. ....  
2. ....
- i. Explain Nursery preparation for the parachute method and establishing plants in the field in four steps
- a. ....  
b. ....  
c. ....  
d. ....
- ii. State two suitable methods that can be used to control brown plant hoppers in the paddy fields
- a. ....  
b. ....

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6. It is found that the harvest of lowland paddy fields has decreased by 50% as a result of failure to control weeds in the first three weeks.
- i. State three types of damage are caused to the paddy cultivation due to weeds
    - a. ....
    - b. ....
    - c. ....
  - ii. Weeds can be controlled by following the procedures of integrated pest plant management in cultivation.  
State three such methods.
    - a. ....
    - b. ....
    - c. ....
  - iii. State two mechanical weed control methods
    - a. ....
    - b. ....
  - iv. State four weeds that are commonly found in mud paddy cultivation
    - a. ....
    - b. ....
    - c. ....
    - d. ....
  - v. Explain the occasions where the weedicides given below are applied in the paddy cultivation
    - a. Non-selective weedicides - .....
    - b. Pre-emergence weedicides - .....
    - c. Post-emergence weedicides - .....

**14. Animal Husbandry**

1. (A). The following diagrams show the interior surfaces of the complex stomach of a ruminant.



- i. Label the parts A, B and C
  - A - .....
  - B - .....
  - C - .....
- i. List one anatomical feature of each part you have identified in the part the above.
  - A - .....
  - B - .....
  - C - .....
- ii. Name the parts in which the following activities takes place.
  - a - The place where cellulose digesting bacteria and protozoa live  
.....
  - b - The place where gastric juice is secreted.  
.....
  - c - The place where the excess water in food is absorbed.  
.....
- iv. In addition to parts A, B and C name the other part/ compartment that makes up the ruminant stomach.  
.....
- v. Of the part A, B and C, which part is the smallest?  
.....

(B). Answer the following questions using the diagrams given below.

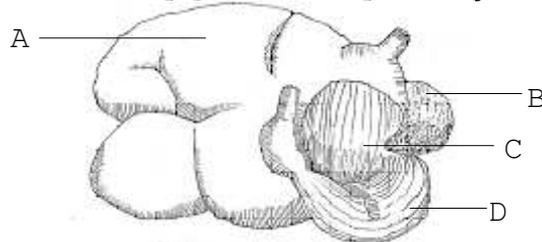


Diagram X



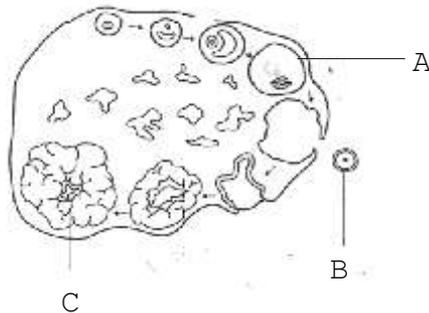
Diagram Y



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- iv. How many generations should this breeding process be continued to produce offsprings with 87.5% Jersey blood?  
.....
- v. What is meant by "Generation Interval"?  
.....  
.....
- vi. Out of cattle and chicken, Which farm animal has the shorter generation interval?  
.....

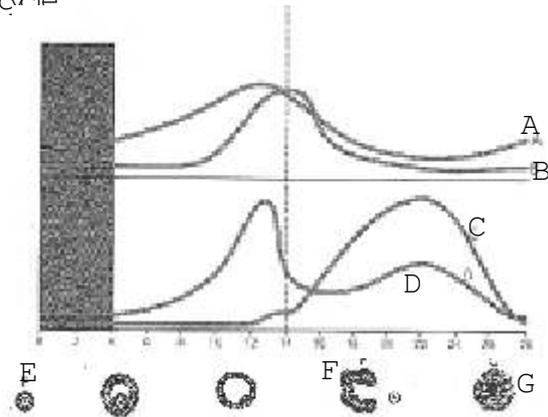
3. (A). A diagram of an ovary of a cow is given below.



- i. Label the parts A, B and C.  
A - .....  
B - .....  
C - .....
- i. List one hormone that is produced in part A and part C.  
A - .....  
C - .....
- ii. Name the phases of the estrus cycle in which A, B and C are formed.  
A - .....  
B - .....  
C - .....
- iv. List four behaviors that can be observed in a cow at stage B.  
a .....  
b .....  
c .....  
d .....
- v. Mention the importance of the part C  
.....  
.....

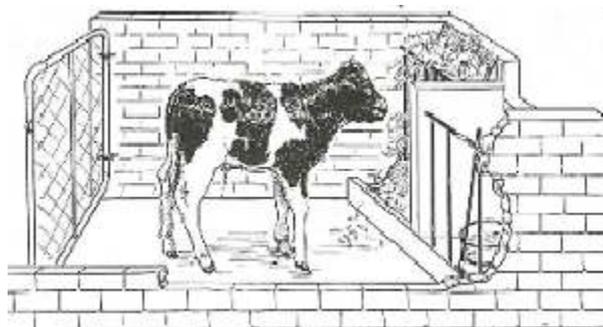
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(B). The diagram given below shows hormone levels at the different stages of the cow's estrus cycle



- i List the hormones that are shown in graphs A and C.  
 A .....  
 C .....
- i State one important function of hormone D in the Estrus cycle.  
 .....
- ii What is the phase "F" ? .....
- iv. Name the organelle that secretes hormone C .....

4. A diagram of a single calf cage is given below.

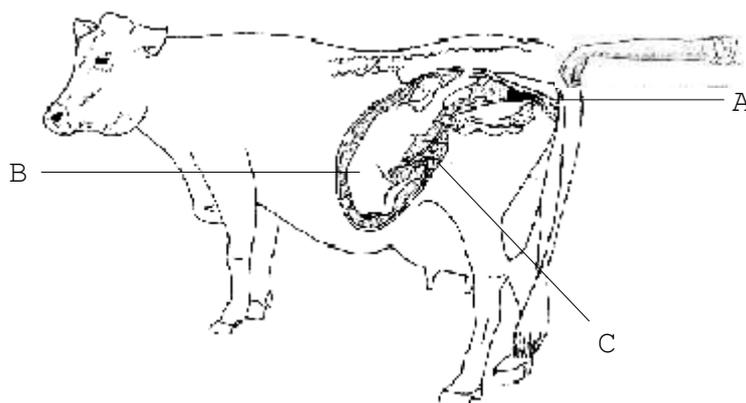


- i For how long is the calf kept in this cage?  
 .....
- i State two advantages that can be got by rearing a calf in a calf cage.  
 a - .....  
 b - .....
- ii State the typical space requirement for a calf in a calf cage.  
 .....
- iv. Explain why a calf is not fed forage while it is housed in the calf cage.  
 .....
- v. List two common calf diseases evident in young calves.  
 a .....  
 b .....

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5. It is important allowing , the calf to suck milk from the cow after the parturization.
- i a. What is the name given to milk secreted a few days before and after parturition?  
.....
  - b List two quality characteristics of this milk.
    - 1 .....
    - 2 .....
  - i After how many weeks from calving will the milk production of a cow reach a peak?  
.....
  - ii State two stimulants that influence milk secretion.
    - a .....
    - b .....
  - iv. State two actions a farmer can take to maximize milk production of a lactating cow .
    - a .....
    - b .....
  - v. State two climatic factors that affect undesirably in the lactation of a cow.
    - a .....
    - b .....

6. A pregnancy diagnosis technique of a cow is shown in the following diagram.



- i Label the parts A, B and C.
  - A .....
  - B .....
  - C .....
- i List two advantages of diagnosing pregnancy at the early stages.
  - a .....
  - b .....
- ii State the importance of the part C.  
.....
- iv. What is the gestation period of a healthy cow? .....

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- v. State four characteristics of a cow that can be observed in parturition.
- a .....
  - b .....
  - c .....
  - d .....

7. A diagram of raising chickens in a brooder is given below.



- i Explain why it is important to raise day old chicks in a brooder .  
.....  
.....
- i a State a problem that can be seen in the brooder above.  
.....
- b Explain the reason for identifying the problem you mentioned in part ii (a) .  
.....
- ii Materials such as sawdust and rice hull are not used as litter for day old chicks. State one reason for this practice.  
.....  
.....  
.....
- iv. Explain why day old chicks are not fed foods during the first 24 hours.  
.....  
.....  
.....
- v. After a few days, bloody stools were observed in the litter of the brooder .Which disease signifies this?  
.....

8. The following list shows the diseases of farm animals.

- |                           |                          |
|---------------------------|--------------------------|
| ● Milk fever              | ● Pullorum               |
| ● Ranikhet                | ● Hemorrhagic septicemia |
| ● Babaciocis (Tick fever) | ● Brucellosis            |

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- i. Out of the above mentioned diseases;
  - a. List cattle diseases .  
.....
  - b. List poultry diseases .  
.....
  
- i. Out of the above mentioned diseases;
  - a. Name a disease that is caused due to a metabolic disorder .  
.....
  - b. Name a disease that is caused due to bacterial infection.  
.....
  - c. Name a disease that is caused due to viral infection.  
.....
  - d. Name a disease that is caused by a protozoan infection.  
.....
  - e. List a disease that can be transmitted from farm animals to humans.  
.....
  
- ii. State two symptoms that can be used to identify unhealthy farm animals.
  - a. ....
  - b. ....
  
- iv. State two actions that can be taken to control the diseases of farm animals.
  - a. ....
  - b. ....

**15. Food and Nutrition**

1. Humans should take a balanced diet to lead a healthy life and to do day to day activities successfully.

i. State two categories according to consumption and nutrient of each category.

Main category	Nutrients
a .....	1. .... 2. .... 3. ....
b .....	1. .... 2. ....

ii. Carbohydrates is an essential component that should be included in main human meals. State three main functions of carbohydrates.

- a .....
- b .....
- c .....

iii. Fatty acids are divided into two categories based on its structural differences. State two categories and give two examples of the each fatty acid

- a .....  
Eg : 1 ..... 2 .....
- b .....  
Eg : 1 ..... 2 .....

iv. Researchers have shown that a lot of health problems arise as a result of long term consumption of the above mentioned fatty acid categories. What is the fatty acid category.

.....

v. State three functions of fatty acids in the human body

- a .....
- b .....
- c .....

vi. What is a Protein's Biological value?

.....  
.....

vii. The Biological value of plant proteins is low. What is the reason for this?

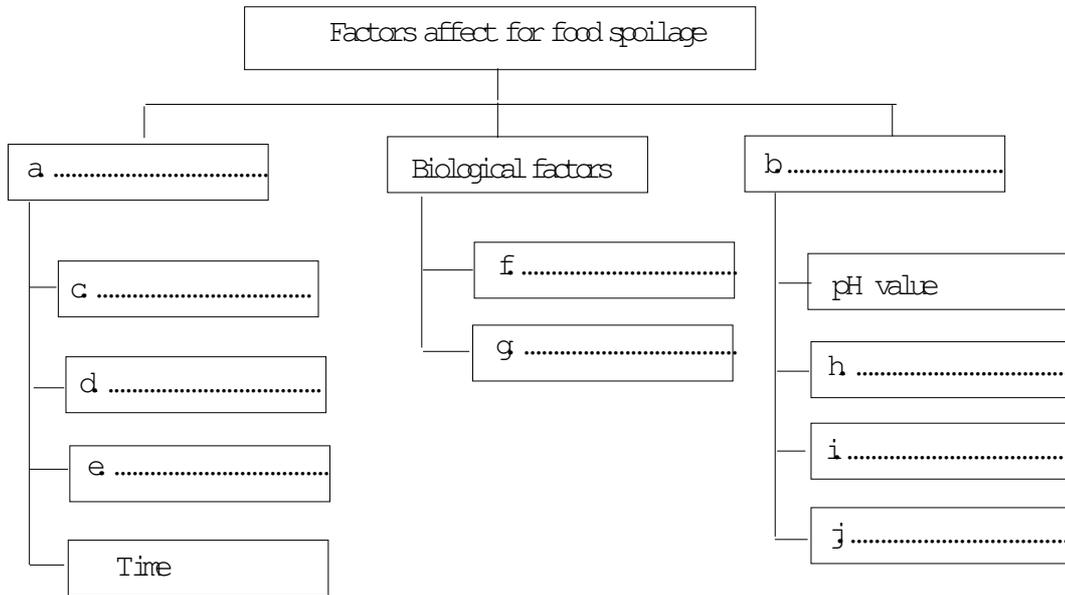
.....  
.....  
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2. (A). Under-nutrition is a prominent nutrient issue in the Sri Lankan society .
- i. State three examples of the most vulnerable groups to this condition
    - a. ....
    - b. ....
    - c. ....
  - ii. There are two types of Under-nutrition. Name them.
    - a. ....
    - b. ....
  - iii. State three malnutrition symptoms that can be observed in children who are suffering from Protein Energy Malnutrition.
    - a. ....
    - b. ....
    - c. ....
  - iv. State two diseases that occur as a result of long term protein energy malnutrition.
    - a. ....
    - b. ....
- (B). Obesity has become a common health issue in the adult population in Sri Lanka.
- i. What is the cause for obesity generally?  
.....
  - ii. State three diseases related to obesity?
    - a. ....
    - b. ....
    - c. ....
  - iii. List strategies which can be applied to control the above mention disease?
    - a. ....
    - b. ....
    - c. ....
3. "A group of garment workers were hospitalized as a result of consuming spoilt food ".The above headline was in the newspaper published recently .
- i. What is meant by "food spoilage"?  
.....  
.....
  - ii. Give five characteristics of spoilt food
    - a. ....
    - b. ....
    - c. ....
    - d. ....
    - e. ....

- ii. Three types of factors that affect food spoilage and their parameters are as shown in the flow chart given below. Complete it appropriately.



4. The colour of food changes from light brown to dark brown or black when food is processed. This occurs as a result of non-enzymic browning.

i. State two non-enzymic reactions

- a .....
- b .....

ii. Write the equations for the above mentioned colour changing reactions.

- b .....
- c .....

i. Name a food industry where the above reactions are used in a positive way.

.....

iv. When an iron knife is used for cutting fruit or a vegetables the cutting surface of the vegetable or the fruit becomes black or brown in colour. What is the reason for this colour change?

.....

.....

.....

5. (A) Different types of preserved food can be seen in the Sri Lankan market.

i. What is meant by food preservation

.....

.....

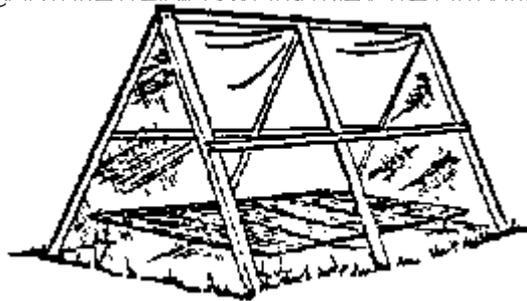
.....

- ii. State four basic principles used in food preservation
  - a .....
  - b .....
  - c .....
  - d .....
- i. Write examples of the food preservation techniques when you use the above preservation principles food preservation.

Example

- a .....
  - b .....
  - c .....
  - d .....
- (B) Blanching is commonly used in Fruit and vegetable product industry
- i. What is the use of the blanching process  
.....  
.....
  - ii. State two main types of blanching methods
    - a .....
    - b .....
  - i. Chlorosis is an issue when vegetable and certain fruits are blanched. State a substance that can be used to prevent chlorosis  
.....

- (C). The Illustration given below is an instrument used in drying fruits



- i. Briefly explain the principle which is used to operate the equipment  
.....  
.....  
.....
- i. State two benefits of food drying
  - a .....
  - b .....

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6. A diagram of food packaging is given below.



- i. What is meant by "packaging"  
.....  
.....
- ii. State four characteristics of a food packaging material
  - a. ....
  - b. ....
  - c. ....
  - d. ....
- iii. State three conventional packaging materials used in day to day life
  - a. ....
  - b. ....
  - c. ....
- iv. Depending on the physical characteristics of packing materials they can be divided into three main categories. State these three categories and give examples for each category
  - a. ....  
Eg : 1 ..... 2 .....
  - b. ....  
Eg : 1 ..... 2 .....
  - c. ....  
Eg : 1 ..... 2 .....
- v. State the most suitable type of polyethylene to pack the following food products

Type of food	Type of polyethylene
a. Fresh vegetables and fruits	.....
b. Bakery products (Buns, Bread)	.....
c. Biscuits and snacks	.....
d. Soft drinks and water bottles	.....
- vi. Large and medium scale food production companies use modern packaging techniques for packing their products. State four such modern techniques.
  - a. .... b. ....
  - c. .... d. ....

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vii. Food packaging and labeling are two interrelated processes. State three main points that should be included in the main label of a food package.

- a .....
- b .....
- c .....



viii. If the following logo is marked on a label what does it indicate?

- .....
- .....

7. Food security is important for a healthy life. For that reason a consumer should have opportunity to buy standard food.

- i. According to the above statement what is meant by food 'standardization'?  
.....  
.....
- ii. State two factors that are considered in food standardization
  - a .....
  - b .....
- iii. State an institute that is obliged to assure consumer protection for the consumers food of .  
.....
- iv. State two types of standards that are implemented in Sri Lanka.
  - a .....
  - b .....
- v. what policy controls implementation of food standards in the country ?  
.....
- vi. State two main objectives of the policy mentioned above.
  - a .....
  - b .....
- vii. According to clause ii of the policy, who is the main authorized person for food in Sri Lanka? .....

8. i. State an example of the following food additive.
- |                     |         |         |
|---------------------|---------|---------|
| a Colourings        | 1. .... | 2. .... |
| b Preservatives     | 1. .... | 2. .... |
| c Antioxidants      | 1. .... | 2. .... |
| d Flavour enhancers | 1. .... | 2. .... |
| e Flavours          | 1. .... | 2. .... |

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- ii. What is meant by 'food preservative'?
- .....
- .....
- i. What is the common food preservative compound used in the following food production processes?
- a Milk based products .....
- b Meat and Cheese industry .....
- c Fruit Juice .....
- d Bakery products .....
- In the recent past the text messages were received mentioning that certain food products with **E** numbers are not suitable for consumption.
- iv. What is the range of E grade for colourings?
- .....
- v. State a reason why foods with certain 'E' numbers are not suitable for consumption.
- .....
- vi. Addition of artificial flavours for certain foods is totally prohibited. Give examples of such foods.
- a .....
- b .....
- c .....
9. The following diagram shows two main types of malnutrition conditions in Sri Lanka.



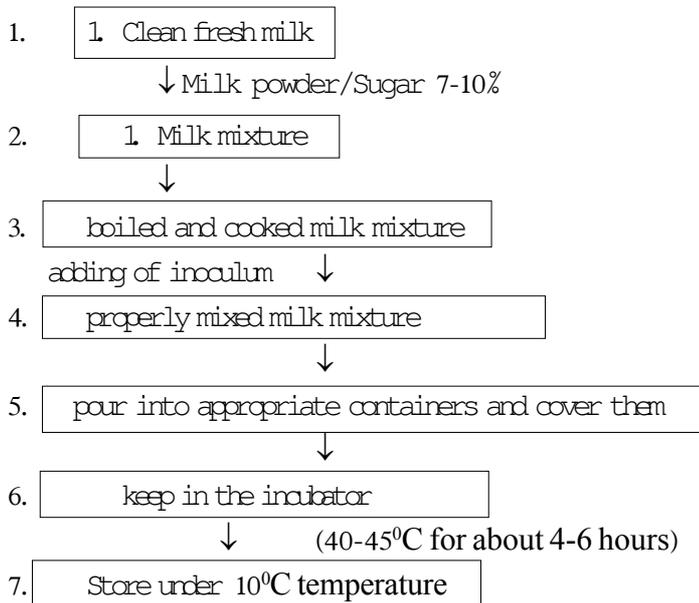
- i i Name A and B stages
- A. - .....
- B. - .....
- ii. State two symptoms that can be observed in A and B malnutrition.
- a .....
- b .....

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- i. State four reasons that lead to the above situations.
  - a .....
  - b .....
  - c .....
  - d .....
- iv. State two diseases that can arise as a result of long term protein energy under-nutrition.
  - a .....
  - b .....
- v. State two characteristics that can be observed in children suffering from the above mentioned of disease.
  - a .....
  - b .....
- vi. State three procedures which can be applied to prevent the above mentioned disease in children.
  - a .....
  - b .....
  - c .....

10. The flow chart of a production process of a milk based product is shown below .



- i. Which production process of milk is depicted by the steps in the above flow chart.  
.....
- ii. According to the above flow chart why is powder milk added to the milk mixture  
.....

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- i. In the third step of this process at which temperature should the milk be boiled and how long should the milk mixture be maintained at that temperature.
- Temperature : .....
- Time period : .....
- iv. Additives are added to the boiled and cooled milk mixture. State the microbe species in the addition which is added to the culture.
- a .....
- b .....
- v. What is the main function of these microbe species?
- .....
- vi. What is the purpose of keeping the culture added milk in the incubator?
- .....
- vii. Why is the final product stored at 10°C in the end?
- .....
- viii. According to the above flow chart the produced milk based food can be stored in the refrigerator only for 5-7 days. State the reason for the impossibility of storing the product for a long period in a refrigerator .
- .....
- .....
11. In Pajarata, a lady farmer who made pickle out of the collected ripened limes in her home garden, packed them in bottles and sold them at a high price in the off season.
- i. What is the preservation method that is used by lady to prepare lime pickle?
- .....
- ii. What is the principle used in the above preservation method?
- .....
- i. In addition to this preservation method, state two other materials that can be used for preservation, based on the above principle.
- a .....
- b .....
12. Cheese is a food prepared by fermentation of milk.
- i. What is "fermentation process" ?
- .....
- .....
- ii. State three basic types of fermentation processes.
- a .....
- b .....
- c .....

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- iii. What is the principle used in the production of cheese?  
.....
- iv. What is the name given for the water that is removed from the cheese milk?  
.....
- v. What is the enzyme used to coagulate the cheese milk?  
.....

13. Write down the types of vitamins identified by the chemical names given below.

i.

<b>Chemical</b>	<b>Types of vitamins</b>
a Thiamin	.....
b Riboflavin	.....
c Piridoxin	.....
d Cyanocobalamin	.....
e Tocopherol	.....
f Ascorbic acid	.....

ii. Most animals be synthesze vitamin C in their body, but huran beings can not. Write down the reason for this.

.....  
.....

i. Which vitamin helps to prove the opinion of getting fairness of skin, beauty and being young.

.....

iv a. The disease called xerophthalmia occurs due to the defficiency of a vitamin. What is this vitamin?

.....

b. State two symptoms of the disease mentioned above.;

1. ....

2. ....

v. State three practices that can be adopted to prevent the above mentioned V itamin deficiency vitamin.

a .....

b .....

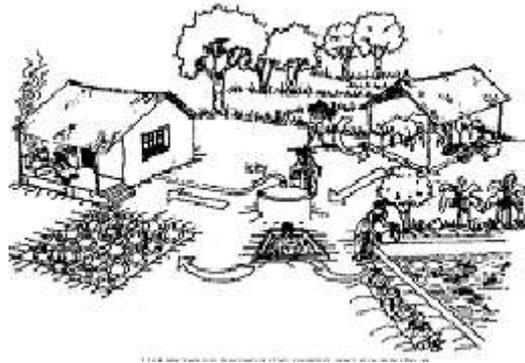
c .....

**16. Environment friendly agriculture**

1. (A). Given below are two farming methods practiced in Sri Lanka



A



B

- i a Name farming method 'A'.  
.....
- b State four strategies that enhance productivity of the farming method.
  - 1. ....
  - 2. ....
  - 3. ....
  - 4. ....
- i a Name farming method 'B'.  
.....
- b State two advantages of farming method B relatively to 'A' farming method.
  - a .....
  - b .....
- ii a Out of the above two farming methods what is more environmental friendly farming method.  
.....
- b State four reasons for this.
  - 1. ....
  - 2. ....
  - 3. ....
  - 4. ....
- iv. State two advantages of crop-animal rotation.
  - a .....
  - b .....

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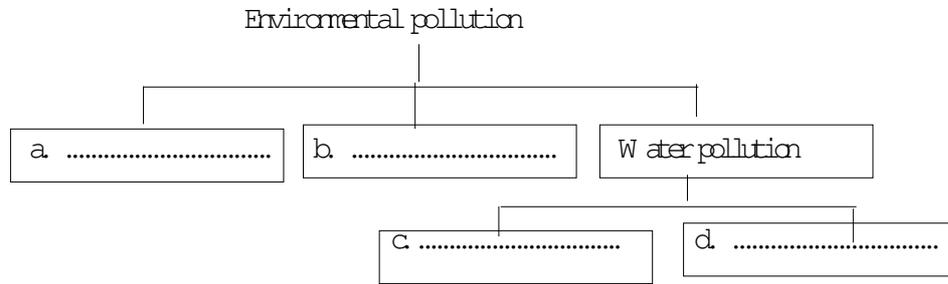
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2. In order to increase harvest from unit area of crop cultivation in Sri Lanka different cropping patterns are used.
- i. Name a plantation crop commonly cultivated as a mono crop.  
.....
  - i. State two disadvantages of mono crop cultivation.
    - a .....  
b .....
  - ii. State two characteristics that can be observed in a mixed crop cultivation.
    - a .....  
b .....
  - iv. State two factors that need to be considered when crops are selected for mixed crop cultivation.
    - a .....  
b .....
  - v. State three advantages of crop rotation.
    - a .....  
b .....  
c .....
3. (A). i. What is meant by dry land farming.  
.....  
.....  
.....
- i. State three factors that need to be considered when crops are selected for dryland farming.
    - a .....  
b .....  
c .....
- (B). i. State three occasions of improper ways of waste disposal in Agriculture.
  - a .....  
b .....  
c .....
- i. State three disadvantages of inappropriate waste water management.
    - a .....  
b .....  
c .....

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4. Improper agricultural activities can be considered as the main factor for environment pollution.

i. Fill in the blanks below on environmental pollution



ii. Name the process that leads to a massive growth of Algae in the aquatic environments.  
.....

iii. State two types of ions which cause the above process.

a ..... b .....

iv. Name the disease that occurs and affects infants due to the increase Nitrates in drinking water.  
.....

v. Name three disadvantages that can occur to the environment due to the usage of chemical fertilizer.

a .....

b .....

a .....

5. Conservation farming is helpful to minimize damage to the environmental systems.

i. State three basic natural resources that are conserved in conservation farming.

a..... b.....

c.....

ii. State two strategies which can be adopted to conserve each resource mentioned above.

a - 1. ....

2. ....

b - 1. ....

2. ....

c - 1. ....

2. ....

iii. State two advantages of conservation farming

a .....

b .....

**17. Agricultural Economics**

1. The demand function is  $Q_d = 100 - 5P$  and the supply function is  $Q_s = 16 + 7P$  for a particular good.  $Q_d$  and  $Q_s$  are quantities and  $P$  is the price.

i Calculate the equilibrium price and quantity of this good.

.....  
.....  
.....  
.....

ii Calculate equilibrium price and quantity, if the government introduces minimum price Rs 4 for this good.

.....  
.....  
.....  
.....

iii Calculate the extra demand due to the certified price.

.....  
.....  
.....  
.....

iv. Calculate the excess demand due to the certified price.

.....  
.....  
.....  
.....

v. Mention four factors which influence the supply of agriculture products.

a .....  
b .....  
c .....  
d .....

2. According to the competition in market, several market structures can be seen.

i What is meant by a market?

.....  
.....

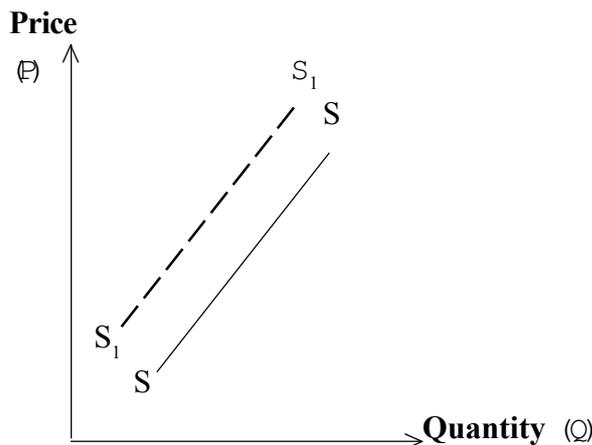
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- i. Mention three characteristics which can be observed in perfect completion market.
  - a .....
  - b .....
  - c .....
- ii. Mention three characteristics which can be observed in the monopoly market.
  - a .....
  - b .....
  - c .....
- iv. Mention three characteristics which can be observed in the oligopoly market.
  - a .....
  - b .....
  - c .....

3. (A). 1. Indicate X or (  ) how following reasons /points af fec the supply .

Reasons	Increase	Decrease
a. Providing subsidies.	.....	.....
b. Increasing the production cost.	.....	.....
c. Increasing taxes.	.....	.....
d. Increasing the price of the good	.....	.....
e. Introducing new techniques.	.....	.....

(B). The following graph illustrates the shifting of the supply curve



- i. Mention two reasons for the shifting the supply curve as illustrated in the above graph.
  - a .....
  - b .....

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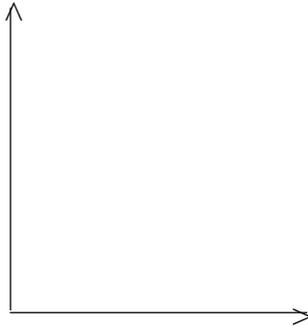
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i What is 'supply elasticity'?

.....  
 .....  
 .....

4. Consumer demand is the ability and interest to purchase a particular good of given different prices.

i Illustrate the relationship of price and quantity of demand on the following graph.



i Indicate how the following reasons / points affect demand of the particular good.

<b>Reason</b>	<b>Increase</b>	<b>Decrease</b>
a Increase of propoganda	.....	.....
b Increase of income of the consumer	.....	.....
c Decrease in the preference of the consumer	.....	.....
d Decrease in the price of the complementary good	.....	.....
e Increase of price	.....	.....

i Describe the following terms.

a Direct demand

.....  
 .....

b Cross demand

.....  
 .....

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c Multiple demand

.....  
 .....

d Derived demand

.....  
 .....

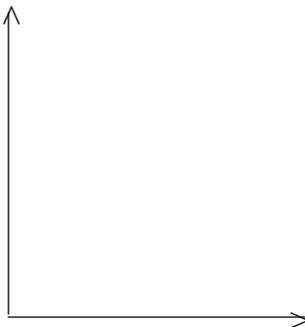
iv. What is price elasticity of demand?

.....  
 .....

5. The following table illustrates the yield of crops chilli and paddy obtained from different combinations of land in the land area of 8 ha.

<b>Paddy Area</b> (ha)	<b>Chili Area</b> (ha)	<b>Total yield of paddy</b> (kg)	<b>Total yield of chili</b> (kg)
0	8	0	4 000
1	7	1 000	3 900
2	6	2 000	3 700
3	5	3 000	3 400
4	4	4 000	3 000
5	3	5 000	2 500
6	2	6 000	1 900
7	1	7 000	1 000
8	0	8 000	0

i Draw the production possibility curve by using the above data.



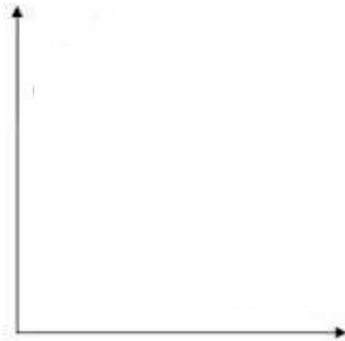
i What is the factor which is determined by the optimum combination of production in the production possibility curve?

.....

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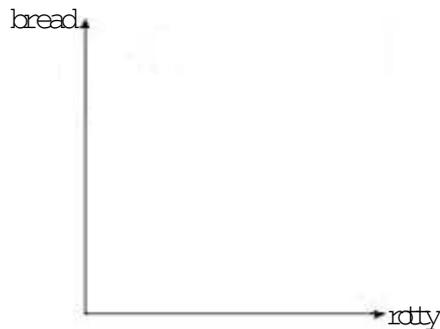
i. Illustrate the relationship of total production and inputs in the following graph.



iv. Calculate the marginal income of a particular agricultural good when the marginal production is 5 and the price of a unit product is R\$4.00.

.....  
.....  
.....

6. The following graph illustrates the utility of a particular consumer who consumes bread and rotty in different amounts.



i. What is this curve called?

.....

i. What is the slope of this curve called?

.....

ii. Mention two characteristic of this curve

a .....

b .....

iv. At which point does the consumer reach equilibrium point?

.....

v. What is the most appropriate economic term used to introduce these two goods?

.....

# Structured Essay Answers

## 1. The Development of Agriculture in Sri Lanka

1.
  - i.
    - a Polgo lla
    - b Pardenigala
  - i.
    - a To make the country self-sufficient
    - b Decrease unemployment
    - c Generate hydropower electricity
    - d Social and cultural development of the Mahaweli colonists/Apply new scientific and technological methods instead of conventional agriculture practices/ Colonization of the lower valley of the Mahaweli River
  - ii.
    - a Urbanization/Environmental pollution
    - b Loss of lands to the people/ social problems
  
2.
  - i.
    - a Tisa wewa – King Devanampiyatissa
    - b Minneriya tank – King Mahasen
    - c Kala wewa – King Dathusena
    - d Parakrama Samudraya – King Parakramabahu
  - i.
    - a Inability to fetch water easily from rivers for the increasing population
    - b To face problematic situations such as famines that occurred from time to time
  - ii.
    - a Palapanawa – to protect the tank bund
    - b Spill gate – To release excess water in the tank
    - c Sluice gate – Issuing water from the tank
    - d Biso kotuwa – To control the water pressure
  - iv.
    - a Ground water recharge
    - b Decreasing environmental temperature.
  
3.
  - i.
    - a Constructing tanks and anicuts/ Cultural development
    - b Exporting food items
  - i.
    - a Proper water management/local irrigation technology
    - b Clear vision on governing the country
  - ii. King Parakramabahu
  - iv. Mahawansaya
  
4.
  - i.
    - a Coffee                      b Rubber                      c Cinchona                      d Tea/ Coconut
  - i.
    - a Construction of roads/ enhancing productivity of lands
    - b Income generation/ Creating employment opportunities

***(A/L) Agricultural Science - Structured Essay Questions and Answers***

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- i. a. Environmental issues due to deforestation and use for plantations
- b. Harm to the cultural heritage connected with local agriculture and certain additions the from western culture to the local culture
- c. Failure of local food production as a result of neglecting subsistence farming, Less food security, Spending foreign exchange to import food items
- iv. a. Horticulture/Plant nurseries
- b. Mushroom cultivation
  
- 5. (A) i. Capacity to get the required type of food in the required quantity, of the recommended quality, of the required type and at the required time.
- i. a. Increase the production of main food
- b. Popularize local food among people/Take necessary action to minimize post-harvest losses
- ii. a. Increase demand for farm inputs
- b. Healthy population by fulfilling nutritional requirements/ Increase processed products
  
- 6. i. a. Department of Agriculture
  - 1. Lead agriculture research
  - 2. Crop cultivation plans/ production of certified seeds and certify seeds/ promoting new technology related to agriculture.
- b. Department of Agrarian services
  - 1. Solve farmers' problems
  - 2. Irrigation water management/ Provision of agricultural inputs and services/ providing loans for agricultural activities
- i. a. Private
  - 1. CIC
  - 2. Hayleys, Lanken, Baur
- b. Non-government organisations
  - 1. Sarvodaya
  - 2. CARE International/ UNDP/ Save the children

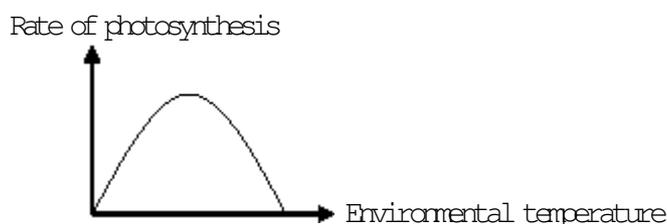


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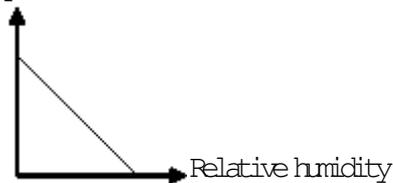
- vii. a. Red - Formation of branches and seed germination  
 b. Green - leaf cell growth  
 c. Yellow - lengthening of internodes and seed initiation  
 d. Blue and red - photosynthesis
3. i a. Maximum temperature - Maximum thermometer  
 b. Minimum temperature - Minimum thermometer
- i a. High temperature - Increase of transpiration rate  
 b. Low temperature - Cold damage the plants
- ii a. Altitude  
 b. Geographical location  
 c. Vegetative density  
 d. Human activities

iv.



4. i A- Dry bulb thermometer  
 B- Wet bulb thermometer  
 C- Muslin  
 D- Water
- i Capillary force
- ii Water coes up along the muslin and gets evaporated when it reaches the bulb resulting in lower reading in thermometer 'B'.
- iv. Reading of the dry bulb = 30°C  
 Reading of the wet bulb = 27°C  
 Temperature difference = 3  
 Relative humidity as per chart = 78%
- v. The place where exists higher relative humidity.
- |  |  |
|--|--|
| At X location - Reading of 'A' is 31°C | At Y location - Reading of 'A' is 31°C |
| Reading of 'B' is 29°C                 | Reading of 'B' is 28°C                 |
| Tem. difference = 2                    | Tem. difference = 3                    |
| Relative humidity = 86%                | Relative humidity = 79%                |
- Accordingly, place A has the highest relative humidity.

vi. Rate of transpiration



vii. a. Rooting of stem cuttings is easy

b. High Pollination

viii. a. Increase in plant diseases

b. Disturbs the dispersion of pollen

c. Difficult to store seeds

5. i

**Parameter**

**Instrument**

a. Rainfall

1. Recording and non-recording rain

b. Maximum air temperature

2. Maximum thermometer

c. Minimum air temperature

3. Minimum thermometer

d. Number of sun shine hours

4. Sun shine recorder

e. Intensity of light

5. Pyranometer

f. Relative humidity

6. Dry and wet bulb thermometer

g. Wind direction

7. Wind vane

h. Wind speed

8. Anemometer

i. Evaporation

9. Evaporation pan

ii

a. To select the crop to be cultivated

b. To determine the crop duration

c. To decide on the irrigation water requirement for a crop

**i**

a. Rain gauge - Top level of the rain gauge should be 30 cm above ground level. Place the rain gauge on a specially constructed concrete base

b. Anemometer - Place 2 m above the land and in a clear area where there are no wind barriers.

c. Wind vane - Place at a location where no wind barriers.

d. Thermometer - Place at a location where there is no direct sunlight

iv.

a. Rainfall

b. Maximum and minimum temperature

c. Number of sunshine hours

d. Wind speed

e. Evaporation

v.

8.30 a.m. & 3.30 p.m.



**(A/L) Agricultural Science - Structured Essay Questions and Answers**

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- i. a. Rainfall  
d. Vegetation
- b. Altitude  
e. Nature of the soil
- c. Land use
- iii. Climatic zone  
Average annual rainfall (mm)
- a. Dry zone  
less than 1,750
- b. Intermediate zone  
1,750 – 2,500mm
- c. Wet zone  
More than 2,500
- iv. Climatic zone  
No. of ecological zones
- a. Dry zone  
11
- b. Intermediate zone  
20
- c. Wet zone  
15
- v. a. Able to identify similar climatic zones  
b. Able to plan cultivation according to Yala and Maha season  
c. Easy for planning and implementing agricultural projects  
d. Able to do zoning of agricultural lands ./  
Easy for development of land and conservation activities
- vi. a. Low country wet zone  
b. More than 3,200mm  
c. Less than 300m
9. i. A – Stillwell                      B – Evaporation pan                      C – Wooden frame
- i. a. to measure the water level.
- ii. 25
- iv. a. Cylindrical pan of 120cm diameter 25cm height.  
b. Making out of galvanized sheets and painting it white  
c. Place on a wooden frame.  
d. Covering with a net./ Maintain the water level in the container at 180cm height
- v. Adding the reading of the evaporation pan to the reading of the rain gauge
- vi. Total reading of the evaporation pan = (180mm + 10mm) = 190 mm  
Reading of the following day = 185mm  
Therefore, daily evaporation value = (190mm - 185mm) = 5 mm
10. i. A – Anuradhapura                      B – Galle
- i. Anuradhapura - Dry zone  
Galle - Wet zone
- iv. 46
- v. a. I - Climatic zone  
c. 3 - Wetness
- b. U - Altitude zone  
d. a - Rainfall distribution

### 3. Effect of soil factors on crop harvest

1.
  - i.
    - a. Gravimetric method
    - b. Gypsum block method
    - c. Field Tensiometer method
  - i. Method – Gravimetric method  
Reason – Easy to measure this method
  - ii. Soil augers
  - iv. Moisture percentage =  $\frac{50-40}{40} \times 100$   
= 25%
  - v.
    - a. To absorb nutrients/ seed germination
    - b. Plant growth
2.
  - i.
    - a. Cation exchange capacity =  $4.0 + 8.5 + 3.5 + 4.0$   
= 20 milliequivalent
    - b. Base saturation =  $Mg^{2+} + Ca^{2+} + K^{+}$   
=  $4.0 + 8.5 + 3.5$   
=  $4.0 + 8.5 + 3.5$   
= 16 milliequivalent
    - c. Base saturation =  $\frac{16}{20} \times 100$   
= 80%
  - i. To absorb plant nutrients
3.
  - i. A frame
  - i. To mark contours
  - ii.
    - a. Three wooden sticks
    - b. Thread
    - c. Plumb
  - iv.
    - a. preparation of drains according to contour lines.
    - b. preparing soil ridges according to the contour lines.
    - c. making terraces.
4.
  - i.
    - A. Munsell colour chart
    - B. Decicator
    - C. Soil auger
    - D. Field tensiometer
  - i.
    - A. To determine the colour of the soil
    - B. To cool the soil sample heated in the oven without moisture



***(A/L) Agricultural Science - Structured Essay Questions and Answers***

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- iv. a Microbial activity  
b Cultivated crop
  - v. a Gravitational water    b Capillary water    c Hydroscopic water
9.    i M – Organic zone  
      N – B zone  
      P– C zone  
      Q – Parent rock
- i    P layer
  - ii   Q layer
  - iv. M layer
  - v. M layer
- Reason – Abundance of organic matter
10. i    Specific gravity bottle is used to find the true density . It has a capillary hole. In order to avoid blocking of soil particles in the tube soil has to be sifted.
- i    a     $(15 - 9) \text{ g} = 6 \text{ g}$   
      b     $(20 - 9) - (24 - 15) \text{ g}$   
           $= (11 - 9) \text{ g} = 2 \text{ g}$   
      c     $\frac{6 \text{ g}}{2 \text{ g}} = 3 \text{ g/cm}^3$
  - ii   Normally true density is in the range of  $2.3 - 2.8 \text{ g/cm}^3$
  - iv. greater

## 4. Plant nutrition

1.
  - i.
    - a Denitrification/utilizing nitrogen by microbes and weeds
    - b Soil erosion/ evaporation
    - c Leaching
    - d Nutrient fixation
  - ii.
    - a Nitrogen deficiency – Urea/Ammonium Sulphate
    - b Potassium deficiency – MCP/ Potassium Nitrate
    - c Magnesium deficiency – Kieserite/Epsom salt
  - i.
    - a Nitrogen -  $\text{NO}_3^- / \text{NH}_4^+$
    - b Phosphorous<sup>s</sup> -  $\text{H}_2\text{PO}_4^- / \text{HPO}_4^{2-}$
    - c Potassium -  $\text{K}^+$
    - d Magnesium -  $\text{Mg}^{2+}$
  - iv. 

**Advantages**

    - a Fertilizer can be applied according to the nutrient deficiency in the plant
    - b Quick response to the deficiency/ easy to store

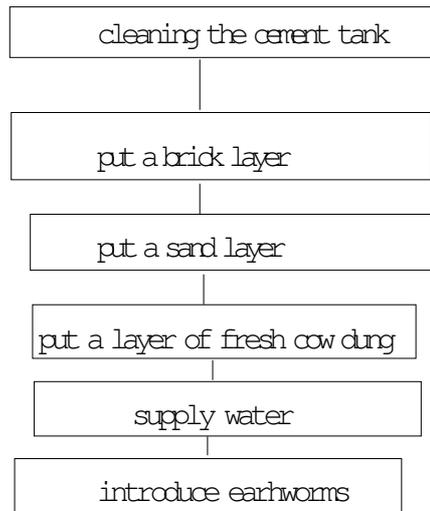
**Disadvantages**

    - a Over use makes toxic conditions to the plants
    - b Unfavourable reactions can take place in the soil/ expensive
  - v. Ammonium Sulphate ( $(\text{NH}_4)_2\text{SO}_4$ )
2.
  - i. 

a 1. Potassium	2. Magnesium/Calcium
b 1. Chlorine	2. Nickel/Vanadium
c 1. Aluminium	2. Nickel/Vanadium
d 1. Potassium	2. Magnesium/Chlorine
e 1. Calcium	2. Iron
f Silicene	
3.
  - i.
    - a Nitrogen deficiency / P deficiency
    - b Low pH value
  - i.
    - a  $\text{CaCO}_3$
    - c  $\text{CaCO}_3 \cdot \text{MgCO}_3$
    - b  $\text{Ca}(\text{OH})_2$
    - d  $\text{CaO}$
  - ii.
    - a Planting leguminous plants
    - b Application of Nitrogen fertilizer
  - iv.
    - a SSP/ TSP
    - b Apatite
  - v. The limiting factor of crop harvest is the least available nutrient. Yield increases when its availability is increased.
4.
  - i.
    - a Arabandu/ Tamarind/Wild sunflower
    - b Gliricidia/Kappetia/Albesia/Gang sooriya/Acanahiriya/Karanda
  - i.
    - a Bury in the field after growing in the field.
    - b Bring from outside and add to the soil



B. i



- i
  - a. as it is an eco-friendly method/ profitable method
  - b. less labour requirement
- ii
  - a. making liquid manure using fish residuals (waste materials)
  - b. plant leaves/ making liquid manure using animal manure

## 5. Land preparation

1.
  - a. Increased
  - b. Decreased
  - c. Not changed
  - d.
  - e. Not changed
  - f. Not changed
  - g. Decreased
  
2.
  - i. Zero tillage
  - ii.
    - a. Clearing narrow border only through a row.
    - b. Opening a small furrow through the cleared row to sow seeds.
    - c. After sowing seeds along the furrow, covering them with soil.
  - iii. Application of non selective weedicides
  - iv. Mudding / Puddling
  - v. Because, it completely breaks the soil structure
  
3. (A)
  - i. Build up of hardpan within soil layers due to continuous operation of farm machinery
  - ii.
    - a. Direct contact of rain drops with soil
    - b. Uneven irrigation during dry spells
    - c. Operation of farm machinery
    - d. Human and animal action on soil
  - iii.
    - a. To make a field suitable for cultivation
    - b. To improve soil characters
    - c. To manage weeds
    - d. To improve soil organic matter
    - e. To control pest and diseases
    - f. To conserve soil moisture
    - g. To conserve soil moisture
  
- (B) **Advantages**
  - a. Less soil erosion along slopes
  - b. Due to the absence of land preparation, time gap between two cropping seasons can be minimized / Less soil compaction / Due to the presence of crop residues between plant rows, the soil characters can be improved. / reduce cost for land preparation

**Disadvantages**

- a. Decreases the seed germination
  - b. Organic matter decomposition rate will be reduced / Nutrient releasing rate will be reduced / able to apply excess chemical fertilizer/ decrease making root nodules of legumes/ happen to apply chemical weedicides to weed control.n sowing seeds / Stabilization of pest and diseases due to application of inorganic weedicides
- 4.
- i. a. The fields where the land preparation cannot be practiced at the proper time  
Eg : no rain
  - b. The fields which are subjected to continue soil erosion
  - c. The fields where the land preparation cost is high
  - ii. a. Soil moisture conservation
  - b. Low cost
  - iii. Glyphosate
  - iv. a. Remaining of inorganic residues
  - b. Emergence of resistance varieties
- 5.
- i. Mammaty, Craw bar, Fork
  - ii. Leveling fork / leveler
  - iii. Disc plough
  - iv. Dual blade mould board plough
  - v. Hand plough
  - vi. Rotovator
  - vii. Disc plough
  - viii. Ridger
  - ix. Japanese rotary weeder
  - x. Hoe
- 6.
- i. a. Early flowering / increasing pest damages
  - b. Reduction in harvest due to less growth duration / Occurrence of empty seeds during panicle development due to water stress.
  - ii. with onset of
  - iii.a. Time saving
  - b. Less labour cost
- 7.
- i. a. Pulling the machine backwards
- Forward movement of the machine due to the rotation of metal lugs
- b. Conveying seedlings on to the soil and transplanting them

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- ii. a. 20 cm
  - b. 10 cm
  - iii. a. Less requirement of seeds. /Chance to germinate seeds in separate nursery up to the transplanting stage.
  - b. The gap between two cropping seasons can be minimized. /Easiness in handling machinery during post sowing operations.
  - c. decreases the competition among root system due to proper spacing
- 8.
- i. Raised beds
  - ii. a. A flat land/ Well drained soil
  - b. place where gets good sunlight
  - c. Easiness in transporting materials
  - iii. To destroy disease causing pathogens in a nursery media.
  - iv. a. Burning / Applications of fungicides
  - b. Direct sunlight / Fumigation / Hot water treatment
  - v. a. Healthy , vigorous and homogeneous plants can be obtained for transplanting
  - b. can establish uniform plant population/ Easiness to handle maintenance practices.
- 9.
- i. Jhon pulle seed sower
  - ii. A - seed box
  - B - seed tubing
  - C - floater
  - iii. A - stores the seeds
  - B - conveys the seeds from the box onto the ground
  - C - Facilitate smooth running of the machine on top of muddy surfaces/ cover the seeds which drop into the soil
  - iv. a. Spacing can be maintained in between two rows of plants.
  - b. Easiness in carrying out post sowing operations
- 10.
- i. Noridoko nursery
  - ii. a. Organic matter
  - b. Top soil
  - iii. Cucurbitacea
  - iv. a. To obtained maximum number of plants
  - b. Less root damages during transplanting/ Homogenous and healthy plants can be obtain for transplanting/ Tolerate for heavy rains

## 6. Irrigation and Drainage

1.
  - i. a. for photosynthesis/ translocation of foods  
b. to absorb nutrients/ for transpiration process/ for hormone activity
  - ii. deficit of the 50% of the field capacity
  - iii. a. flood/ basin/ ridge and furrow  
b. ring
  - iv. a. evaporation/ transpiration/  
b. deep percolation
  - v. a. mulching the soil  
b. applying organic matter
  
2.
  - i. A - water source  
B - water pump  
C - main tube  
D - nozzle
  - ii. pumping water by applying high pressure against the gravity
  - iii. a - minimum water loss  
b - irrigating should be done evenly over the field  
c - preventing the field becoming muddy  
d - can be used for the slope land even
  
  - iv.  $3 = \frac{\delta}{4d^2}$   
 $d = \sqrt{12/\pi}$   
 $d = \sqrt{12 \times 7/22}$
  
3.
  - i.  $= 1 \times 50 \times (30 - 12) / 100$   
 $= 9 \text{ cm}$
  - ii.  $= 0.8 \times 15 \text{ mm/day}$   
 $= 12 \text{ mm/day}$
  - iii.  $= 9 \text{ cm} / 1.2 \text{ cm/day}$   
 $= 7.5 \text{ days}$
  - iv. height of the column of water  $= 9 / 100 \text{ cm}$   
extent of cultivated land  $= 0.5 \times 10\,000 \text{ m}^2$   
capacity of water  $= 9 / 10\,000 \times 0.5 = 450 \text{ m}^3$
  
4.
  - i. dig a hole of 30 x 30 x 30 cm in the field and fill it with water. If the water hasn't drained within one hour, the drainage is very poor. If it drains within one hour, the drainage is good / favourable.
  - ii. a. The groundwater level is situated at high level.  
b. stagnation of water frequently in low land/ compaction of sub soil / ploughing to the same depth.
  - iii. a. plant leaves become yellowish.  
b. growth of the plant becomes weak.  
c. damping off (roots) / producing toxins which harmful to the plant.  
d. spreading of diseases / falling down the plants.

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- iv. a paddy / Kankun  
b Kohila
  
- 5. i a nature of the field / nature of the soil  
b crop that has been cultivated/ the economic level of the farmer
- i a methods of surface drainage  
b methods sub surface drainage  
c pumping  
d use of plants
- ii a herring bone drainage system  
b grid drainage system  
c parallel drainage system  
d random drainage system
- iv. a improving aeration of the soil.  
b easy to operate farm equipment  
c decomposition of organic matter  
d easy for activities of land preparation.

## 7. Plant Propagation

1.

Statement	correct	incorrect
i. New plants can be obtained by selection of plants based on the variation effected by environment.		✓
ii. Tripod plants produce a large amount of small seeds.		✓
iii. There is a direct relationship between the moisture content of the seed and the storage period without effecting the viability of seed.		✓
iv. Genetic variability can be visible in sexually propagating plants		✓
v. The growth of the hypocotyle is speeded up plants having hypogeal germination.	✓	

2. (A)

	Suitable method to removal seed dormay
i. Teak	removal of seed coat / burning
ii. Mango	cutting or removing seed coat
iii. Letuce / Salad	providing red light
iv. Paddy	soaking in water / chemical treatment
v. Bitter gourd	split seed coat

- (B)
- i. Moisture percentage <11-13%
  - ii. Germination percentage more than 85%
  - iii. Percentage of weed seed < 5 seeds / 500g
  - iv. Percentage of other crop seed < 5 seeds / 500 g

- 3.
- i. a. Monocotyledons - Kurakkan, paddy, maize
  - b. Dicotyledon - capsicum, anan, tomatoes  
snake gourd, okra, lufa, ladies fingers
  - ii. In monocotyledon
  - iii. wash out inhibitors
  - iv. a. Thick seed coat / shiny seed coat
  - b. immature embryo / inactive embryo/ light sensitive
  - v. a. Bearing strong / vigorous root system
  - b. Having genetic diversity

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4. i 1. green gram seeds                      4. boiled and cooled water  
       2. normal water                            5. wet cotton  
       3. coconut oil layer
- i A. - At room temperature                      C. - At room temperature  
    B. - At room temperature                      D. - in a refrigerator
- ii A. - seeds are germinated                      C. - seeds are not germinated  
     B. - seeds are not germinated                      D. - seeds are not germinated
- iv. Air and temperature are needed for germination of seeds.

v. 
$$\frac{180}{200} \times 100 = 90\%$$

5. i. Stock doesn't have slanting cut.  
    i low height of the stock from the ground level to the budding joint.  
    ii wrap the budding joint from top to bottom.  
    iv. growing a sprout from the stock.

Seed	Reason for seed dormancy	Seed treatment
a. Mango	thick seed coat	removal of seed coat
b. Anthurium	Seed coat with inhibitors	washing out inhibitors
c. Bitter gourd	thick seed coat	blasting the seed coat
d. Tamarind	Impermeable / shiny seed coat	scratching the seed coat
e. Teak	Thick seed coat	burning the seed coat

- i a     having a vigorous root system / resistant to adverse environmental conditions  
    b     1. a recommended mango variety to the area.  
        2. a variety which having improved characteristics

Parts of tissue hnrk	Task	equipment
a) Cleaning room	cleaning of explanted equipment	electric oven, water taps
b) Media preparation room	Preparation of tissue cultivar and sterilization	refrigerator, electric heaters and mixtures pH meters auto clave
c) Inoculation room	cutting tissues for the required size and transferring into the media	Laminar flow cabinet
d) preparation room / Culture room	providing required environmental condition needed to multiply the plants	air conditioning machines flourescent lamps

7. i A - Cotyledons                                      D - Hypocotyl  
    B - Seed coat                                        E - Plumule  
    C - Radicle

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- i A - storage of food
- B - Provide protection to seed
- C - growing as the root system
- ii Epigeal germination
- iv. a Bean / Green gram / soya
- b cocoru / paddy
- v.

**Dicotyledon seeds**

- a contain two cotyledon
- b reserve food in cotyledons / most probably several seeds in one fruit only

**Monocotyledon seeds**

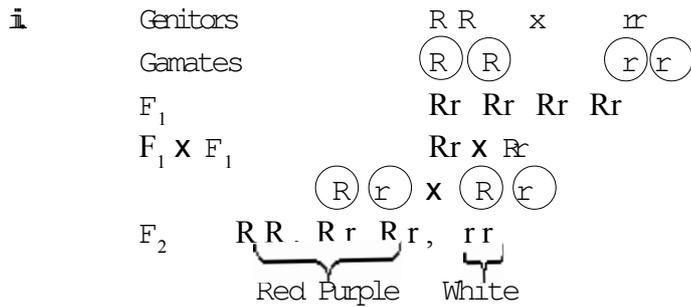
- contain one cotyledon
- reserve food in endosperm
- most probably one fruit contained one seed

8. i a. Germination percentage more than 85%
- b free from impurities
- c unbroken seeds / filled / complete seeds
- d free of pest damage / free of weed seed or other seeds
- i a. Samples which are randomly taken from bags or container of the seed stock
- b Two sample taken by mixing primary samples
- c The sample which are forwarded the to laboratory
- ii a Ragtoll method
- b petridish method
- c Sand box nursery method
- iv. 
$$= \frac{175}{250} \times 100$$
$$= 70\%$$
9. i axial suckers
- i a. 1. stalk suckers
2. axial suckers
- b axial suckers
- ii To prevent fungi diseases bottom part is dipped in a potassium permanganate solution /To prevent pest damage dip in a insecticid solution and keep 3-4 days in a shaded place
- iv. sward suckers
10. a tetra sodium chloride - to determine seed viability
- b seed probe - To take out seeds from the stored seed bags.
- c Budding strips - The wrap the budding joint after finishing budding
- d Imble acitic acid - for rooting of plant stem cuttings.
- B. i A - Anther
- C - Ovary
- B - Pollen grain
- D - Pollar nuclears
- i A - Seed coat / Integument
- B - Ovary/ fruit
- C - Ovary wall / Pericarp
- D - Ovum / seed

## 8. Plant Breeding

1. i Transmission of characteristics from generation to generation is called inheritance  
i The study of heredity, or how the characteristics of living beings are transmitted from one generation to the next  
ii a. There are several pairs of characteristics which are easily observable and have morphological distinct  
b. Plants taken for the experiment are considered pure plants.  
c. Fertile progeny can be obtained by crossing selected plants / Plants can be grown very easily.  
Self-pollination and cross-pollination can be done according to necessity  
iv. Cultivars in which certain characters appear in successive generations as a result of inbreeding or self-fertilization is known as pure lines or true breeding.
2. i a Rounded seeds 100%                      b Rounded seeds 100%  
i genes  
ii homologous  
iv. alleles
3. i The observable physical or biochemical characteristics of an organism, as determined by both genetic makeup and environmental influences are known as traits or phenotype.  
i The way a particular gene is an allele to represent a certain character is called genetic variation or genotype.  
ii RR, Rr, Rr, rr  
iv. pure lines  
v.  $RR \times rr$   
     $\swarrow \searrow$   
    Rr  
    100%
4. i a Allelic gene that dominate the expression of the other allelic genes on the same locus of chromosomes.  
b The allele which is suppressed by the dominant allele  
i
- |                         | Genotype | Phenotype |
|-------------------------|----------|-----------|
| a. Homozygous dominant  | RR       | Purple    |
| b. Heterozygous         | Rr       | Purple    |
| c. Homozygous recessive | rr       | White     |

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Phenotypic ratio of  $F_2$  purple : white 3:1

Genotypic ratio of  $F_2$   $RR : Rr : rr$  1 : 2 : 1

5. A. i Inheritance factors are in pairs and during gamete formation, these factors segregate from each other so that each gamete carries only one allele for each gene.
- ii Mono-hybrid cross - A genetic cross between homozygous individuals but with different alleles for a single gene locus of interest
- Di-hybrid cross - A genetic cross between individuals with different alleles for two gene loci of interest
- B. i During gamete formation the segregation of the alleles of one allelic pair is independent of the segregation of the alleles of another allelic pair
- i Principle of independent assortment.
6. The cross to test the accuracy of a
- i hypothesis is called "test cross"
- ii crossing an unknown genotype plant with a homozygous recessive plant
- iii a (Purple - P Red - p Hairy - H Hairless - h)
- |       |           |     |           |           |           |
|-------|-----------|-----|-----------|-----------|-----------|
|       | $PPHH$    | X   | $pphh$    |           |           |
|       | $P$       | $H$ | x         | $p$       | $h$       |
| $F_1$ | $(P) (H)$ |     | $(p) (h)$ | $(P) (H)$ | $(p) (h)$ |
|       | $PpHh$    |     |           |           |           |
- b. 9 : 3 : 3 : 1
- c The result is tally with the Mendel's law
7. i Any difference between cells, individual organisms, or groups of organisms of any species caused either by genetic differences (genotypic variation) or by the effect of environmental factors on the expression of the genetic potentials (phenotypic variation)
- i a. To increase yield potential
- b. To increase the quality of the yield
- Ex: Increasing the percentage of protein and fat content of the crops

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- c. To develop pest and disease tolerant plants
  - eg: To develop pest and disease tolerant plants
  - To obtain tolerance for unfavorable environmental conditions
- d. improvement of the harvest quality
  - eg : taste of fruit, shape, colour, plants which resistant to adverse environment
  
- ii. a. Cross breeding
- b. Mutation breeding
- c. Biotechnological approaches
- iv. Selective breeding
- v. a. Inbreeding
- b. Cross breeding
- vi. Inbreeding depression (recessive genes become homozygous)
  
- 8. i. Mass selection
- i. Advantage - Technical knowledge is not needed so much.
- Disadvantage - After passing a number of generation, the character will not increase further
- ii. Production of progeny by crossing two individuals with different gene constitutions
- iv. a. Number of fruits
- b. Increasing pod number, pod size, early flowering, increase the resistant to pest and diseases
- v. Hybrid vigor
  
- 9. i. a. decreased
- b. homozygosity
- c. In general crop plants gametes are haploid while somatic cells are diploid.
- d. can't be seen
- e. can
- i. a. 1. plasmids                      2. viral vectors, cosmids, and artificial chromosomes
- b. A genes that made by multiply a single gene through asexual propagation.
- ii. To study specific genes
  - Multiplication of genes before insertion to another organism
  - Production of medicines
- iv. a. Identification of the gene that has the required value
- b. Cutting and separation of the gene
- c. Multiplication of separated gene
- d. Insertion of the separated gene into a vector
- e. Insertion of the gene into tissues of a targeted plant
- f. Growing the plant in a medium of artificial tissue culture.
- g. Selection of the plants with inserted gene

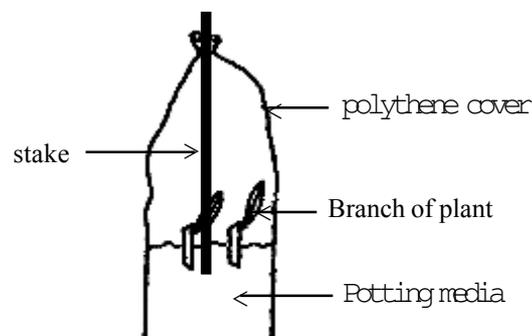
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- v. Terminator gene technology/suicide seed production
  - vi.
    - a. Insect tolerant plants
    - b. Salinity tolerant plants
    - c. Herbicide tolerant plants / golden rice
- 10.
- i. One haploid set of chromosomes in the genes is defined as the genome.
  - i. One haploid set of chromosomes in the genes is defined as the genome.
  - ii. A gene pool is the collection of all genes in a population.
  - iv.
    - a. Volcanic eruption
    - b. diseases
    - c. meteoric shower
    - d. earthquake / Tsunami
  - v.
    - a. Over exploitation of resources
    - b. Environmental pollution
    - c. Introduction of new species to the environment / Developmental projects / Selling gene resources
- 11.
- i.
    - a. Report - Red data list
    - b. Organisation - IUCN
  - i. The last member has definitely died
  - ii. Grow them in botanical gardens
  - iv.
    - a. Maintain genetic diversity within the gene pool
    - b. Conserve genetic balance in the environment
    - c. Protect favorable characteristics for future breeding programs / Provide initial materials for biotechnology / Protect mutants produced by mutations
  - v.
    - a. Strict nature Reserves.
    - b. National parks
    - c. reservations/ sanctuaries
  - vi.
    - a. Ability to store lots of seed within a limited space
    - b. Easy to transport/ Durability is higher
  - vii. Philippines

## 09. Controlled Environmental Agriculture

1. A.
    - i. Controlled environmental agriculture / Crop cultivation under controlled environment
      - i. a. temperature
      - b. light
      - c. relative humidity / wind
    - ii. a. protection of soil moisture
    - b. protection of soil temperature
    - c. weed control / decrease evaporation
  - iv. a. a coir dust
  - b. straw / coconut leaves / Illuk / Mana
- 
2. i. propagation structures which are used to control environment with in short time at different growth stages of crops
  - i. a. plant bed covers
  - b. unit propagation structure / water conservation structure / hot beds / cold frames / simple solar propagators
- ii. a. discolouration of polythene with the time
- b. high temperature in wet zone
- c. environmental pollution
- 
- iv. a. salad leaves / lettuce
- b. bell pepper / salad cucumber
- 
- v. a. upcountry wet zone
- b. upcountry intermediate zone
- 
3. (A).
  - i. simple solar propagator
  - ii. a. high temperature
  - b. high relative humidity
  - iii. a. bamboo (una bata)
  - b. PVC tube/ polythene
  - iv. top soil : decomposed cow dung 1 : 1
  - fine sand : compost 1 : 1
  - v.



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4. (A) i. polythene tunnel  
ii. profitable / availability of raw materials  
iii. increase of internal temperature  
iv. Nwara eliya  
v. a. entering sun light is limited due to discoloration of polythene  
b. entering sun light is limited due to growing of algae on polythene  
c. occurrence of pest and diseases
- (B) i a. temperature  
b. wind / light  
c. moisture / relative humidity / light of light  
d. light  
ii i high expenses for construction  
ii a. breeding purposes  
b. research purposes / cultivation of ornamental flowers and plants / agroforestry for export  
iv. a. assemble thermo sensors - thermo regulators  
b. increase relative humidity - using foggers misters  
c. assemble / installation of fans to leave hot air  
d. roof with holes / making saw tooth type/ use of wet pad  
v. a. suitable for cultivating crop  
b. to the environment / suitable to region / economic level
5. (A) i cultivation of crops using other planting media instead of soil  
ii i as a aqueous nutrient media  
ii a. solid media culture  
b. hydroponic culture (growing in nutrient solution)  
c. nutrient solution culture  
d. aeroponic technique
- (B) i nutrient film technique (NFT)  
ii i circulation of nutrient solution  
ii a. soil become acidic  
b. soil become saline  
c. soil degradation
6. (A) i N, P, K  
ii i Hydrolyzation of urea which necessary for a absorption of plant or urea degradation does not take place in hydroponics as in soil.  
ii a. pH value  
b. electrical conductivity
- (B) i a flexibility  
b. brittleness  
c. ability to retain of water  
d. aeration / well drainage / buffering action / free from harmful microorganisms and nematoda  
ii i a. gravel / fine stones  
b. saw dust / coir dust / coir fibre

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- c. rockwool, perlite
  - d. polyurenin, polyether
  - ii. a. Resistant to ultraviolet radiation
  - b. inner surface black and outer surface white in colour
  - iv. solid media – coir fibre
  - reason – non heavy / light
  - v. a. aeration
  - b. favourable temperature
  - vi. a. high initial cost
  - b. required technical knowledge and experience
  - c. consuming energy
  - d. eliminating substances (polythene plastic) are unfavourable for the environment
8. i. a. boil in the steam oven for 1 hour
- b. sterilize by solar radiation about two weeks / apply fungicide
- i. a. Paper pots
- b. Plastic containers
- c. pots made of coir tubers
- d. nursery trays / styrofoam trays / sponge nurseries
- ii. a. ability to apply fertilizer properly and evenly
- b. ability to apply fertilizer according to the weather condition and the growth rate of the crop.
- c. does not pollute ground water by reduction of nutrient increase the efficiency of fertilizer .
- iv. a. does not need a large field
- b. can be grown / cultivated in a flat even
- c. it is not a cultivation which need high labour such as preparing beds , weeding, irrigation, / able to conduct a continuous farming/ easy to engage labour as it is an attractive farming method/ able to get soilless planting materials for the competitive market (seed potato)
- v. a. tomatoes
- b. bell pepper
- c. salad cucumber
- d. cabbage / strawberries

## 10. Crop Physiology

1.	i	Classification	Examples
	a.	C <sub>3</sub>	Bean / carrot / paddy
	b.	C <sub>4</sub>	Maize, sugarcane, thampala



- iii. a. ATP  
b. NADPH<sub>2</sub>  
c. O<sub>2</sub>

iv. granum in the of chloroplast

- v. a. carrot / beet  
b. maize / sugarcane

2. i a. speedup seed germination  
b. speed up rootingof stems / roots / cuttings / and leaf cuttings

i based on temperature

ii use of plant propagating structures

- iv. a. temperature  
b. oxygen concentration

3. i a light  
b light  
c temperature  
d water  
i a light  
b. temperature / inhibitors and pollutants/ carbon dioxide concentratrion  
ii a. virus diseses  
b. deficiency diseses

4. i Glucose  
i a. glycolysis  
b. Krebs cycle  
c. electron transpotation  
ii Alcoholic fermentation  
iv. a. Having porous stem - Kankun, Paddy  
b. Having Aerial roots - Kirala / sonaratia  
v. Pinvic Acid transform into lactic Acid in the animal cells and in some bacteria.  
vi. a. Alchol Industry  
b. W ine Production  
c. Beer Production  
d. Sukkey Products  
e. Bakery Products

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5. i. A - Bend towards the cutting direction of the tip of the stem  
 B - Elongation of the specimen  
 C - No changes in the specimen
- ii. Cells located under the cut does not receive auxin and no elongation of cells, and on the other side no barrier to get auxin there fore cell elongation can be seen
- iii. Auxin
- iv. a. IAA  
 b. IBA
- v. B - equal elongation can be seen as a result of receiving the above component to the both sides.  
 C - elongation does not take place as the compound is absent.

6. i. curving towards light  
 ii. the plant grows straight as it receives light from both sides.  
 iii. Auxin moves laterally away from sunlight and their concentration increase leads cell elongation.  
 iv. photo periodic movements.  
 v. In plant nurseries plants turn to the direction of light receives therefor these plants are not suitable for planting / Having plants with crooked stems.

7. i.

No	Observation	Reason
1.	Lateral buds are grown	No auxin production because of the removal of the tip
2.	Lateral buds are grown	Removing effect of auxins as a result of removing of tip (auxin is not produced)
3.	Lateral buds are not grown	Lateral buds are not grown because of having auxins.
4.	Lateral buds are not grown	As a result of having auxins, lateral buds does not grow.

- ii. Auxins produced by the apical bud inhibits the growth of lateral buds.
- iii. Apical dominance
- iv. a. NAA  
 b. IAA / IBA
8. i. a. closing of stomata / control transpiration  
 b. Inhibits growth of shoots / Increase the growth of root/ induce the bud dormancy / induce the seed dormancy / Heterophylly
- ii. a. chloroplast  
 b. from top to bottom  
 c. in both directions (top to bottom and bottom to top)  
 d. xylem or phloem
- iii. a. rooting of stem cuttings  
 b. as weedicides
- iv. a. Auxin  
 b. Cytokinin
9. i. a. tubers  
 b. Bulb  
 c. corn
- ii. Phloem translocation

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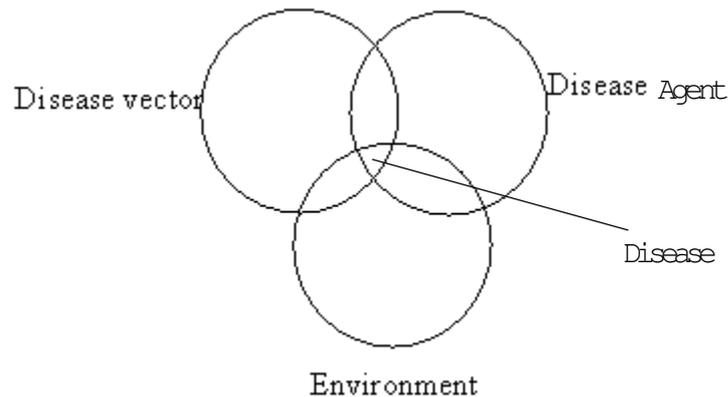
- ii. Tissue - Phloem tissue.  
Structures - sieve tubes  
- companion cell
- iv. It is a bio chemical process which converts light energy from the sun into chemical energy by utilizing light energy by photosynthesis pigments and using inorganic nutrients such as CO<sub>2</sub> and H<sub>2</sub>O. The produced organic food stores light energy as chemical energy.
- v. 
$$6\text{CO}_2 + \text{H}_2\text{O} \xrightarrow[\text{chloroplast}]{\text{solar energy}} \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{CO}_2$$

10. i. A - Root hair  
B - Epidermis  
C - Cortex  
D - Endodermis
- ii. a. Active absorption  
b. Inactive absorption
- iii. In a younger /tender root, suberin or lignin or both has deposited as strips in the radial and transverse walls. This is referred to as caspian strip
- iv. Transportation of water through xylem tissue which is located in the middle of a root by radial transportation up to leaves through the stem vertically

## 11. Pests

1.
  - i.
    - a Yellow stem borer / Cut worm / Gold midge
    - b brown plant hopper
  - i.
    - a Larval stage
    - b Adult stage
    - c Larval stage
    - d Adult stage/ Larval stage
  - ii.
    - a Solutions/emulsions/wettable powder
    - b Soluble powder/granules
  - iv.
    - a Damage to the bio-diversity
    - b Destruction of favorable organisms
    - c Aquatic fauna dying increasing
    - d Environmental pollution/soil pollution
  
2. (A).
  - a Selective
  - b Systemic
  - c Systemic
  - d Glyphosate
  - e 3, 4 -DPA
  - f 2, 4 -D / MCPA

(B). 
  - a Type of weeds in the field
  - b Age of the weed/the time of application of weedicides
  
3.
  - i Small swollen parts in the root system
  - i Round worm disease
  - ii.
    - a Yellowing of leaves
    - b Wilting of plants/die back
  - iv. Soil sterilization
  - v.



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4. i a 1. Batadella  
2. Welmaruk  
b 1. Thun hiriya/Kokmota  
2. Kalanduru  
c 1. Gadapana/Apala  
2. Pitawakka  
d 1. Kimbul Mukunuwenna  
2. Gadapana (Lantana)
- i Kalanduru has ground stems. Ground stems also die by applying systematic weedicides.
- ii a Reducing yield by competing with the crops  
b Reducing the quality of the yield  
c Reducing the efficiency of the farmer  
d Blocking of waterways/ limited number of cultivable crops/ Spreading of pests and diseases
5. i A - Apilachna beetle  
B - Fruit fly/ Ill fly
- i A - To leaves of Cucurbitaceae plants  
B - To fruits of Cucurbitaceae plants
- ii A - Coleoptera  
B - Diptera
- iv. A - Complete metamorphosis  
B - Complete metamorphosis
- v. A - Eating of plant leaves  
B - Rotting of fruits

## 12. Post Harvest Technology

1.
    - i.
      - a. Decreases the quality of fibre content in the pod.
      - b. The state of sponge can be seen among ridges
      - c. not having angular shape of fruits
      - d. skin colour becomes 75% purple
      - e. Stage of producing the heritable smell or odour
    - ii.
      - a. spreading scars
      - a. yellowing is starting from the stalk
    - iii.
      - a. potatoes / onion
      - b. onion / types of yams
      - c. leeks / beans
      - d. papaya
    - iv.
      - a. fungus
      - b. Bacteria
  
  2. (A)
    - i. Qualitative and quantitative loss takes place in different stages in the crop harvest from the time of harvesting until the food stuff reaches the final consumer
      - a. minimizing loss of harvest
      - b. able to do harvest diversification
      - c. production of the quality of the harvest
  
  - (B)
    - i.
      - a. Durable crops
      - b. perishable crops
    - ii.
      - a. climatic
      - b. non climatic
  
  - i. 

Climatic	Non Climatic
After picked up increase respiration rate induced ripening induced ripening after pick up	respiration rate decreases continuously minimum production of ethylene not induced not ripening after pick up
  
  - iv.
    - a. climatic – banana, avocado
    - b. non climatic – grapes, Belli, lime
- 
- (C)
  - i. 

Internal factors	external factors
a. respiration	a. pest damage
b. transpiration	b. disease infection
  - ii.
    - a. not applying fertilizer on the proper time
    - b. not providing systematic water supply
  - iii.
    - a. at harvesting
    - b. at cleaning
    - c. at packing
    - d. at storing
    - e. at marketing



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4. (A) i a passive invasion – enter through cracks or wounds  
b. active invasion – pathogenes enter the field and later they are activated
- i a stalk end rotting diseases  
b fungi  
c treatment – hot water treatment  
method – after harvesting, soak in hot water (50-55 °C) for few minutes (5-10 minutes)
- (B) i collecting time for harvesting  
a in the morning after dried out dew  
b in the morning after dried out dew  
c before 10.00 a.m in the morning  
d between 10.00 a.m – 3.00 p.m  
e between 10.00 a.m – 3.00 p.m
- i a harvesting manually  
b. harvesting by machines and equipment
- i. a bamboo baskets / sack  
b plastic / polythene
5. i a low temperature  
b high relative humidity
- i 80-90%
- ii freezing in low temperature helps under go chilling injuries and scorches
- iv. 8-10%
- v. increase fibre content (maturity)

### 13. Home Garden

1.
  - i.
    - a. selection of suitable crops for area and the season
    - b. selection of crops with less problems/ selection of healthy plants/ selection of suitable crops according to soil moisture, sunlight and wind.
  - ii.
    - a. prevailing appropriate plant population
    - b. pruning of plants when necessary, training, management of brushes
    - c. plants are strengthened by using organic manure/ crop rotation/ maintaining suitable crop combinations/ frequent investigation
  - iii.
    - a. mogosa seed extraction
    - b. garlic juice
    - c. tobacco extraction
  - iv.
    - a. providing water pools to bird for bathing
    - b. providing feeding places for birds
  - v.
    - a. dragon fly
    - b. frog
    - c. pheasant
2.
  - i.
    - A – sun loving, bearing fruit – ex – papaya
    - B – leafy vegetables
    - C – shade loving plants – Anthurium
  - ii.
    - a. pot culture
    - b. soilless culture
    - c. vertical growing techniques
  - iii.
    - a. Supplying water in the morning and evening
    - b. Drip irrigation using simple methods
    - c. Controlling weeds systematically
    - d. Recycle the water removed from the kitchen and bathing well/ organic mulching
3.
  - i.
    - a. Homoptera
    - b. Hemiptera
    - c. Lepidoptera
  - ii.
    - a. tortoise beetle
    - b. slim dragonfly
  - iii.
    - a. places where paddy are cultivated in the small narrow lands
    - b. when bunds of the paddy field are not maintained properly / places where mass of houses near the paddy lands
  - iv. from the stage of panical invitation to the harvesting stage

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4. i reproductive stage  
i A – panicle initiation  
C – maha bandi stage  
E – soft dough stage  
F – hard dough stage  
ii at the stage of E  
iv. emergence of panicle from the sheath of flag leaf
5. i a in November  
b 1. Bg 300/ At 307/ At 308/ Ld 365/ Bg 357/ Bg 360  
2. At 306/ Bg 364  
i a put mud into the plastic trays with special small cups  
b. germinate paddy seeds on it  
c. allow to grow them about 10 cm height in 12–15 days  
d. remove the seedlings with mud from the cups and broadcast them in the fields  
ii a. keep proper spacing / do staggered cultivation  
b. timely cultivation (cultivation in correct time) control weeds
6. i a. decrease the yield by reducing crop growth  
b. competition for nutrients, space and sunlight  
c. the weed control cost is high / decreasing the efficiency of the farmers / block the water canals  
i any of the the sustainable agriculture technique  
ii a. manual weeding b. using weeders  
iv. Thunessa, Thuhiriya, Girapala, Atawara, kekirindiya  
v. a before ploughing  
b after broadcasting seeds/ before germination of seeds  
c after germination of weeds in the field



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3. (A). i A. - follicle cell  
B. - ovulated ovum  
C. - corpus luteum  
i A. - Oestrogen  
C. - progesterone  
ii A. - pre oestrus  
B. - oestrus  
C. - pro oestrus / meso oestrus  
iv. a uneasiness / separate from other animal  
b shouting frequently  
c shutting up – raising up the tail  
d stretching and bending the spinal code  
v. maintaining pregnancy by secreting progesterone
- (B). i A. - FSH  
C. - progesterone  
i creating heat signs  
ii the stage of ovulation  
iv. corpus luteum
4. i one month  
i a protection from illness and diseases  
b. prevention from wounds / prevention from each other/ protection from adverse environmental conditions  
ii  $0.75 \text{ m}^2$   
iv. unable to digest crude fibre in the rumen because the function of microbes is not taken place properly  
v. a. a pneumonia / infection related to digestive system  
b. worm diseases
5. i a Colestrum / Milkiri  
b 1. the quantity of solid material is high / the quantity of nutrients is high  
2. contain antibiotics / having laxative effect  
yellow colour  
i at 8th week  
ii a seing the calf / washing teats  
b sound of the milking equipments  
iv. a proper nutrition  
b. control pest and diseases / supply proper housing  
v. a. cold stress / heat stress  
b. strong wind
6. i A. - Vagina  
B. - fetus  
C. - uterus  
i a. able to give suitable nutrition required to the cow  
b. able to protect the cow from external obstacles



## 15. Food and nutrition

1. i. Macro nutrients - 1. Carbohydrate 2. Protein 3. Fat  
Micro nutrients - 1. Mineral salt 2. Vitamins
  - ii. a. supplying energy  
b. building up of structural minerals in the body  
c. store as glycogen in liver  
help to maintain body temperature
  - i. a. saturated fatty acids - 1. Butyric acid  
2. Ionic acid / Citric acid / Palmitic acid / Stearic acid  
b. unsaturated fatty acids - 1. Oleic acid 2. linolenic acid
  - iv. saturated fatty acids
  - v. a. to produce sexual hormone  
b. to proper growth of brain  
c. To proper function of metabolic activities in the body  
To proper functioning of blood vessels and nerves
  - vi. ability of having essential amino acids in some proteins
  - vii. essential amino acids are less in plant proteins
2. (A) i. a. Infants  
b. children  
c. pregnant mothers / feeding mothers / persons suffered from infections and other diseases.
  - ii. a. under nutrition  
b. over nutrition
  - i. a. decline in body size  
b. weight loss
  - iv. a. marasmus  
b. Kwashiorkor
  - (B) i. as a result of having extra foods contained carbohydrates and fats, those food are converted into body fat and deposit in the body.
  - ii. a. Diabetes  
b. coronary heart diseases / back pain / cancers / osteo artherites  
stone in gall bladder
  - i. a. changing food habit  
b. do exercise  
c. maintain weight of the body suit to the height and age.
3. i. A food becomes perishable as a result it becomes or losing safety which creates health risks
  - ii. a. change the colour  
b. losing nutritional volume  
c. slimy and stickyness  
d. changing smell / odour  
e. change the taste / rancidity / acidity / loss of attractivity

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- i. a. physical factors  
b. chemical factors  
c. temperature  
d. machinical damages  
e. moisture
- f. micro organism  
g. macro organisms  
h. enzymatic activity  
i. rancidity / non enzymatic browning  
j. enzymatic reaction
4. i. a. melad reaction  
b. caramalization
- ii. a. reducing sugars + amino acids → sugar amino acid complex  
b. Sucrose  $\xrightarrow[-H_2O]{\Delta}$  caramalan → caramalin → hymane  
(pale yellow) (golden brown) (dark brown)
- iii. bakery industry
- iv. The compound called tannin in fruits and vegetables contact with knife and tomato ferri-tannate
5. (A). i. Without loosing value of food as possible and eliminate the factors caused to food spoilage by controlling artificially is known as food preservation and handling.
- ii. a. Inactivating of enzymes  
b. Inactivating of microorganism  
c. minimize physical damages  
d. Decrease water activity / Reduce moisture water / H<sub>2</sub>O content  
e. Prevention of chemicals activity / minimize damager of macro animals.
- iii. a. Inactivate enzymes – Blanching  
b. Control microbial activities – pasturization / Sterilization.  
c. Minimize physical damages – packing  
d. Decreasing water content – Drying / Dehydration / Concentration  
e. Prevent chemical activity – blanching  
f. Minimize damage by macro animals – Drying of cereals and pulses
- (B). i. Use a pre-treatment in food preservation methods.
- ii. a. Blanching by hot water  
b. Blanching by steam / Microwave blanching (by microwave)
- i. Sodium bi carbonate.
- (C). i. Solar energy that comes through transparent polythene as short waves absorbs, by black colour sheet and emits as long waves which are not passed through polythene and it help to increase the internal temperature
- i. a. can keep for a longer time  
b. easy to store
6. i. it is device or set of devices which carry a food product from the place of production until the consumer takes
- ii. a. it does not react with food  
b. non toxic and suitable for food  
c. resistant to moisture  
d. air tight / transparent / ability to print / limit entering and transferring of odour / smells
- i. a. bamboo (kata)  
b. basket  
c. lotus leaves / banana leaves / palm leaves



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- vi. a. uncooked and unprocessed meat
  - b. fish / fruit / vegetables
  - c. infant food / powder of tea leaves / coffee seeds / coffee extraction
9. i. a - malnutrition
- b - over nutrition
- ii. declining - waste away
- i. a. stunted / not having proper weight according to the age
- b. diseases arise in the digestive system
- c. frequent susceptibility of infectious diseases
- d. restrictive condition in the body for absorption of nutrient
- iv. a. marasmus
- b. kwashiorkor
- v. a. wrinkled skin
- b. waste body, has appearance of aging, slim body / enlargement of abdomen and appear forward
- vi. a. giving a balance diet from the infant stage
- b. protect children from infectious conditions
- c. provide foods according to the daily nutrient requirements
10. i. production of yoghurt
- ii. increasing total suspended solids (thickness)
- i. temperature - 85°C
- time about 30 minutes
- iv. *Streptococcus thermophilus* / *Lactobacillus bulgaricus*
- v. Lactic acid production by Lactose in milk
- vi. To provide required temperature for the growth and proper activity of above micro organisms.
- vii. For control (decrease) microbial activity
- viii. Since, preservative is not added in yoghurt production
11. i. concentration / osmotic dehydration
- i. Decrease water activity which help to microbial activity .
- ii. Since increase the concentration solution in outside as exosmosis happens in microben they die.
- ii. a. Sugar
- b. Honey
12. i. The process which inhibits activity of other micro organism in food, by chemical compounds produced by special group of micro organism
- ii. a. Lactic acid fermentation
- b. Alcoholic fermentation
- c. Acetic acid fermentation
- i. milk used for cheese productions is separated in to solid and liquid
- iv. whey
- v. Renet enzyme.

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13. i. a. vitamin B<sub>1</sub>  
b. vitamin B<sub>2</sub>  
c. vitamin B<sub>6</sub>  
d. vitamin B<sub>12</sub>  
e. vitamin K  
f. vitamin C
- ii. Enzymes required for that is not in the human body
- i. vitamin E
- iv. a. vitamin A  
b. Having appearance of wrinkles in cornea of the eye.  
c. Occur Bitolapa in eye / ash colour triangular mottlen appear in whiter area of the eye.
- v. a. Adding various vitamin A containing food to the diet.  
b. Increase the diversity of food.  
c. Cook in high temperature quickly (leafy vegetables pala mellum) adding fat contained food / cooking should be done as minimizing colour change.

## 16. Eco Friendly Agriculture

1.
  - i.
    - a. Chena cultivation
    - b.
      1. Increase the use of fertilizers
      2. Introducing crop rotation instead of shifting cultivation
      3. use intergrated pest control for pest control / use another method to clear forests instead of burning
  - ii.
    - a. integrated farming system
    - b.
      1. the production from the unit area is high
      2. obtaining income and the production from animal husbandry except crops / make use of the resources effectively by producing bio gas
  - iii.
    - a. integrated farming system
    - b.
      1. increase the effectiveness and the income of the farm
      2. reduce the risk and uncertainty
      3. farm resources such as labour, land, water, equipment, animals, waste material fertilizers etc are re-invested efficiently
      4. recycling of waste minimizes environmental pollution / obtaining and income through out the year / the bio gas unit can supply the required energy for the house and the farm / increases the efficiency of the land / as there is a supply of various agricultural products, house members would receive a balanced diet.
  - iv.
    - a. improve physical properties of soil
    - b. increase the efficiency of land
2.
  - i. tea, rubber
  - ii.
    - a. difficult to control the pest
    - b. decrease the yeild from the an unit area / wasting the land
  - iii.
    - a. prevailence 2 or more crops in the field in the same seasons
    - b. These crops mostly in the same age.
  - iv.
    - a. suitable for climate condition in the area.
    - b. considering about the space taking in the arial environment
  - v.
    - a. nutrient balance
    - b. trans location of nutrient
    - c. pest and disease control
3. (A).
  - i. cultivation of crops using small amount of water effciently in the areas where annual rain falls less than 508 mm
  - ii.
    - a. selection crops which is required less amount of water
    - b. selection of crops which can grow faster and cover the soil / land
    - c. selection of crops which conserve water

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- (B). i a. releasing of farm animal 's urine and excretea to water streams  
b. having prawns farms  
c. waste water discharge in rice processing processs is disposed in improper manner
- i a. activating or establishing/ irrigation method unsuitable for the land  
b. sulplying to the field without controlling water in uncontrol manner  
c. irrigation systems are not made properly
4. i a. air pollution  
b. soil pollution  
c. ground water pollution  
d. surface water pollution
- i eutropication
- iii  $N O_2^- / PO_4^{-3} / SO_4^{-2}$
- iv. methmoglobinmia
- v. a. disturbances are occurred to hydrolyc cycle, carbon and oxygen cycles  
b. Destroy microorganism in the soil  
c. Decrease ability of obtaining nutrients to plant due to the acidity of soil
5. A. i a. soil  
b. water  
c. organisms
- i a. 1. make drains / cultivating of crops along contour lines  
2. making stone bunds / terraces  
b. 1. making wind barriers  
2. use organic mulch  
c. 1. use bio logical methods for soil conservation  
2. use integrated pest management methods
- ii a. minimize usage of high cost inputs  
b. minimize enviornmental pollution because of the usage of organic manure as much as possible / the usage of agricultural equipments which need less labour

## 17. Agricultural Economics

1. i At the price equilibrium

$$Q_d = Q_s$$

$$100 - 5P = 16 + 7P$$

$$P = \underline{\text{Rs. } 7}$$

$$Q_s = 16 + 7P$$

$$\text{as } P = 7$$

$$= 16 + 7 \times 7$$

$$= \underline{65 \text{ units}}$$

- ii. as  $P = \text{Rs. } 4$

$$Q_d = 100 - 5P$$

$$= 100 - (5 \times 4)$$

$$Q_d = \underline{80 \text{ units}}$$

under maximum price, supply will be

$$Q_s = 16 + 7P$$

$$= 16 + 7 \times 4$$

$$= \underline{44 \text{ units}}$$

- iii. Quantity of demands before deciding maximum price = 80 units

Quantity of demands after deciding maximum price = 65 units

∴ Increasing demand = 80 - 65

$$= \underline{15 \text{ units}}$$

- iv. Quantity of demands before deciding the certified price = 80 units

Quantity of demands after deciding the certified price = 44 units

∴ Increasing = 80 - 44

$$= \underline{36 \text{ units}}$$

- v. a Price of that commodity  
b Price of substitutional and complementary goods.  
c climatic factors  
d subsidies to producer  
e tax on the producer

2. i Defining the "market"

- i. a. There are more buyers and sellers  
b. goods are homogenous/ No legal units

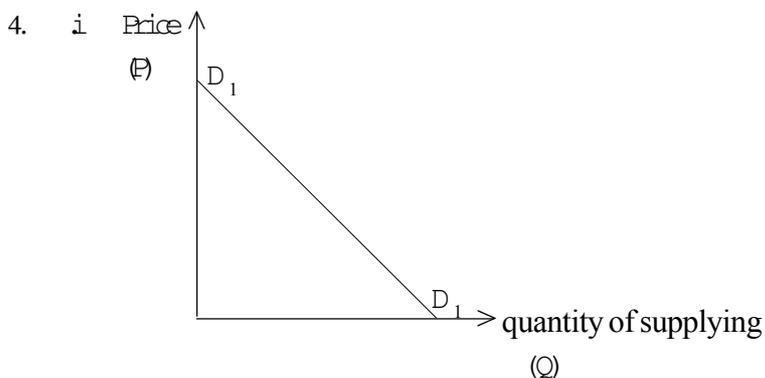
- ii. a. only a single producer  
b. There are no substitution for goods  
c. A continuous excessive profits /  
Barriers to enter the market

- iv. a. large number of buyers  
b. Product variation/ market promotion/ small number of producers

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3. (A)	reason	increase	decrease
	a. provides subsidies	√	.....
	b. price increasing of inputs	.....	√
	c. inforced tax	.....	√
	d. increasing price of the product	√	.....
	e. introducing technology	√	.....

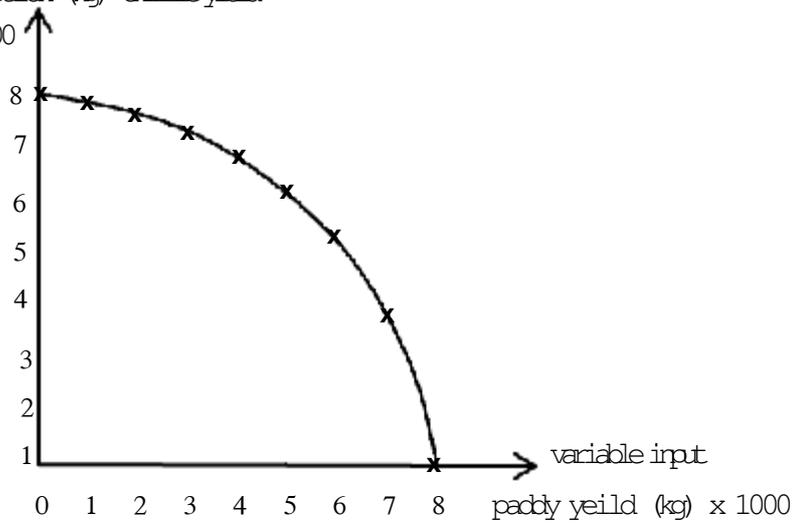
- (B).
- i. a. increase the price of production factors
  - b. adverse government policies / uncertainty of the industry
  - adverse climate factors
  - ii. The marginal supply behaviour
  - the marginal price increase



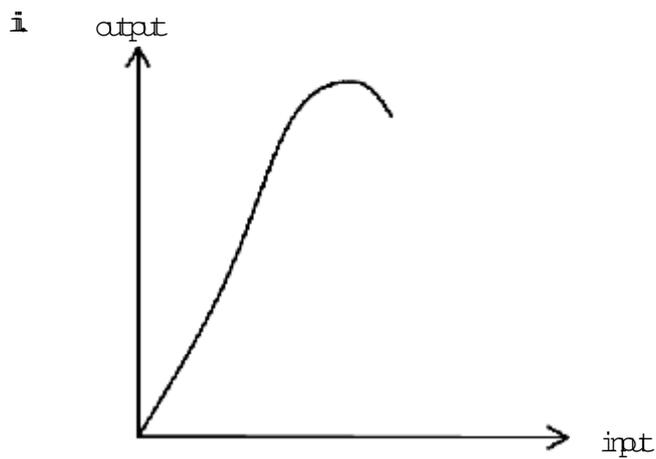
i	reason	increase	decrease
	a. increasing quantity / volume	√	.....
	b. increase of consumer income	√	.....
	c. decrease of consumer interest to a good	.....	√
	d. decrease the price of complementary goods	√	.....
	e. increasing price	.....	√

- ii. a. the demand exist for same goods and services at the end of the consumption
- b. demand fluctuation based on changing of prices of other goods
- c. Demand for a good/ product for various requirements
- d. Demand for a good which expecting to preparing for consumption
- iv. when the other factors affect to demand remain unchanged due to the prize relative change in price

5. i production (kg) chillie yield  
 × 1000



i Iso revenue line



iv. marginal income = MP × Py  
 = 5 × 4  
 = RS. 20

6. i indifference curve

i marginal rate of substitution

- i a. sloping sl from top to bottom / convex to the point of origin
- b. indiffently curves are not intersect

iv. marginal rate of substitution = when the price line slopping

v. substitutes

# **ESSAY TYPE QUESTIONS**



## **1. The Development of Agriculture in Sri Lanka**

1. Explain the adverse effects of the green revolution on agriculture activities.
2. State the challenges and issues affecting the agriculture in Sri Lanka and describe strategies which can be used to overcome those issues and challenges successfully.
3. Describe the strategies adopted by the government for the development of the agriculture in Sri Lanka.
4. Describe the contribution of irrigation projects to the economic development of Sri Lanka.
5. From the past Sri Lanka is considered as an Agricultural country. Explain the reasons for this. Describe the effect of the National Agriculture Policy of Sri Lanka on the development of agriculture.
7. At present, Sri Lanka has become self-sufficient in rice. Explain the reasons for it.
8. Describe the contribution of the agricultural sector to the economic development of Sri Lanka.
9. Explain the contribution of private organizations to the agricultural development of Sri Lanka.
10. Describe the potential to develop the agriculture sector in Sri Lanka. Describe the potential to develop agricultural industry in Sri Lanka.

## **2. Effect of climate on crop cultivation**

1. Explain the climatic factors that affect to the crop cultivation.
2. Describe the factors that lead to differentiate the atmospheric temperature in different regions.
3. Briefly explain the mechanisms of rainfall active in Sri Lanka.
4. Describe the relationship between the rainfall pattern and cropping seasons.
5. Draw the hydrologic cycle and explain it.
6. Explain the factors to be considered when selecting a location to establish an agro-meteorological station.
7. Draw a sketch to show placing of meteorological instruments in an agro-meteorological station and explain it.
8. Explain how natural green house effect contributes to the agricultural activities.
9. Describe adverse effects of climate change on agricultural activities.
10. List the measures that can be taken to minimize the adverse effects of climate change on agricultural activities.

### **3. Soil factors affecting crop cultivation**

1. Name 3 major rocks and explain the genesis of them.
2. Explain physical factors that affect the rock weathering.
3. Describe the specific features of each stratum of a soil profile.
4. Describe functions of soil bacteria in the soil.
5. Explain phenomena which affect the water retention in the soil.
6. Describe the classification of soil water.
7. Describe common types of soil structure according to the shape.
8. Describe techniques that can be taken to convert an unfavourable soil structure to a suitable soil for crop cultivation.
9. Explain problems that arise in cultivating crops in the acidic soil.
10. Describe the types of soil erosion created by rain water.
11. Explain mechanical methods of soil conservation that can be applied by a upcountry farmer in his own field use.
12. Describe agricultural practices which can be followed to rehabilitate a degraded soil.

### **4. Plant Nutrition**

1. Describe how physical qualities of a soil can be improved by organic fertilizer.
2. Explain the advantages of applying organic fertilizer to the soil.
3. Explain the importance of applying balance fertilizer to crops.
4. Describe methods of removing plant nutrients in the soil.
5. Describe the problems of improper fertilizer usage.
6. A farmer wants to produce 1000kg of fertilizer with 15% nitrogen and 10% phosphorus. Calculate the quantity of Ammonium Nitrate (N – 34%) and Triple super phosphate (45%) required for this separately. Calculate the weight of the supplement to be added to the mixture.
7. Explain the relationship between the quantity of fertilizer to be applied to the soil and the crop yield by using the graph.
8. Describe the compost making process.
9. Explain the strategies that can be applied to increase the fertilizer use as efficiency of crops.
10. Describe how soil characteristics affect soil nutrient availability.

## **5. Land preparation**

1. Explain the need for nursery plant production.
2. Describe how to prepare a sand nursery to get stock plants for grafting.
3. Hardening of plants is an essential part of nursery management. Explain how to induce hardening.
4. Explain how to maintain nursery plants.
5. Explain the steps of land preparation.
6. Compare the disc plough and the disc plank.
7. Explain the different methods of planting seeds in a field.
8. Describe primary land preparation methods.
9. Describe the main objectives of land preparation. Define land preparation.
10. Describe the process of preparing a Noridoko nursery up to seed establishment in it.

## **6. Irrigation and Drainage**

1. Describe methods of identifying poor drainage condition of a soil.
2. Describe the factors to be considered when selecting a water pump for the irrigation.
3. Describe the objectives of irrigation.
4. Describe factors affecting irrigation requirement.
5. Describe the factors to be considered when selecting a water source for irrigation.
6. Describe the operation of the piston typed water pump.
7. Describe the surface irrigation methods.
8. List different drainage methods commonly used in crop cultivations and state their advantages and disadvantages.
9. Describe the operation of a centrifugal pump using a named diagram.
10. Describe the advantages and disadvantages of drip irrigation method.

## 7. Plant propagation

1. Describe the seed treatment methods.
2. Describe the advantages and disadvantages of using seeds as a plant propagation method.
3. Describe the factors that affect seed viability.
4. Explain the factors that affect on induction of seed dormancy.
5. Explain the basic setting up of a tissue culture laboratory.
6. Explain the steps of micro propagation.
7. Describe the parts of a typical seed.
8. Describe the methodology of layering a branch of a shoe flower plant which is impossible to be bent down to the earth.
9. Describe the seed germination process.
10. Describe the seed testing methods.

## 8. Plant Breeding

1. Describe the steps of recombinant DNA technology.
2. Describe the importance of gene conservation.
3. Describe the effect of human activities on the destruction of genetic resources.
4. Describe the importance of genetically modified organisms (GMOs) in the field of agriculture.
5. A yellow-flowered garden Pea plant has been crossed with a white flowered garden Pea plant and all the F<sub>1</sub> plants produced Yellow colored flowers. F<sub>2</sub> generation, (produced by self pollination of the F<sub>1</sub> plants), produced 402 yellow flowered plants and 131 white flowered plants. What are the genotypes of the parental plants used for this cross?
6. Describe test cross briefly.  
Describe the method of determination of the genotypes of an organism using a testcross.
7. Explain the causes of genetic variation.
8. Explain purposes of breeding.
9. Explain *ex-situ* conservation of genetic resources.
10. Describe Selection as a method of breeding.

## **9. Crop cultivation under controlled conditions**

1. Describe the problems arising in cultivating crops under controlled condition.
2. Describe the factors that should be considered when planning a crop cultivation under controlled condition at the planning stage of a protected crop cultivation.
3. Describe the reasons for getting a quality yield from the crop cultivation under controlled environmental conditions.
4. Describe the benefits of cultivating crops in the protected houses.
5. Describe the types of semi-permanent propagators used in agricultural activities.
6. Describe issues related to crop cultivation in controlled environmental conditions.
7. Describe the solid medium used in cultivation in soilless culture with examples.
8. Describe the importance of soilless culture.
9. Describe the problems related to soilless culture.
10. In the floriculture export industry the cultivation in the protected houses has become more popular. Explain reasons for this.
11. State suggestions to popularize crop cultivation under the controlled conditions.

## **10. Plant Physiology**

1. Describe the light reaction and the dark reaction in photosynthesis.
2. Describe the main steps of respiration process.
3. Describe the factors affecting to the respiration process.
4. Describe the strategies adopted in the agriculture field to improve efficiency of photosynthesis.
5. Describe the internal factors affecting to photosynthesis.
6. Describe how to improve the efficiency of photosynthesis by maintaining internal factors affected photosynthesis properly.
7. Describe the different ways that transpiration occurs.
8. State plant adaptations which plants have to increase photosynthesis efficiency.
9. The yield can be increased by increasing photosynthesis per unit area. State the field management practices that can be used for this.
10. Describe the usage of plant growth regulators in agriculture.
11. The crop yield can be increased by regulating the plant respiration rate. Prove this statement.
12. Describe radial transportation in a plant when water uptakes from the soil.

## **11. Pests**

1. Describe the different benefits of weeds.
2. Describe the adverse effects of weeds.
3. Describe the adaptations of weeds themselves to thrive.
4. Describe mechanical and agronomic methods of weed control.
5. Describe the suitable Agronomic practices that can be used to control insect and non insect pests.
6. Explain with examples, the different modes by which plant diseases spread.
7. Describe the advantages and disadvantages of using agro-chemicals as pesticides.
8. Describe the information that should be available on the pesticide label.
9. Explain the practices that should be considered when applying pesticides to the field.
10. Describe the mouth parts of insect pests.

## **12. Post Harvest Technology**

1. Describe seed preparation for storage to minimize post- harvest losses.
2. Explain the differences between the raw rice and par-boiled rice.
3. Explain the importance of post- harvest technology.
4. According to the nature of the yield it's shelf life varies. State how the shelf life of a yield varies according to the type of yield and compare and control two types of yields.
5. Certain fruits have to be harvested when they reach to the maximum maturity level on in the tree themselves. Explain the specialty of this yield.
6. Explain briefly the factors affecting post harvest losses in the agriculture crops.
7. Certain activities during harvesting lead to the post harvest losses. Explain such activities and strategies can be used to minimize such losses.
8. Explain the strategies to be adopted to minimize damages in transporting the yield.
9. Explain the main objectives and strategies of parboiling of paddy.
10. Explain the characteristics of a food packaging.
11. Explain the factors to be considered to minimize pre harvest losses.

### **13. Home gardening and paddy cultivation**

1. Describe the factors that should be considered when planning a home garden. Identify the agricultural potentials of a garden – should include information on soil, water, sunlight and space of a home garden.
2. Describe benefits which can be obtained when maintaining a home garden systematically.
3. More benefits can be acquired by planning a productive home garden. For this, it is important to control pests. Describe methodologies that are expected to follow to control pests ecofriendly.
4. Describe methodologies that can be followed to conserve soil in a home garden.
5. Describe the characterization of a formal home garden.
6. Describe the way of the management of soil, water and sunlight as the resources of a home garden.
7. Describe the way of seed paddy self production.
8. Describe the different growth stages of the paddy/rice plant.
9. State commonly used different nursery types in paddy cultivation. Describe advantages of each nursery type.
10. Describe methods of establishment of paddy plants.
11. Describe how to make a dapog nursery.

### **14. Animal Husbandry**

1. Describe the reasons for non-optimal situation of the Animal husbandry in Sri Lanka.
2. Describe the strategies to be adopted to obtain high quality and greater quantity of milk production.
3. Explain the characteristics of a land that is suitable to construct a shed for cattle.
4. Explain the factors to be considered when day old chicks are reared.
5. Explain the importance of including the following substances in the poultry feed ration.
  - powder of grain
  - antibiotics
  - green leaves
  - sea shells
6. Describe the characteristics that should have in the eggs selected for hatching.
7. Describe the stages of culling of layers.
8. Describe the procedures to be adopted to get quality egg production from a poultry farm.
9. Explain the procedures to be adopted to minimize having diseases to farm animals.
10. Describe the importance of sanitary management of farm animals.
11. Explain the steps in the preparation of boiler chicken for meat.
12. Describe the artificial insemination procedure of cows.

## **15. Food and Nutrition**

1. Describe the factors that enhancing the microbial activities which effect to food spoilage.
2. Describe adverse effects of food spoilage.
3. Write short notes about the food preservation methods given below.
  1. Pasteurization
  2. Sterilization
  3. Blanching
  4. Osmotic dehydration
4. Describe the way of increasing the food security and the food availability in the society by food diversification.
5. Though food diversification is a good concept, improper using of it leads to generate different problems in Sri Lanka. The present examples for those situations and explain the limits should be present in food diversification.
6. Describe the production process of milk powder spray drying method.
8. Describe browning effect on food in food industry and the way it affect the food industry.
9. Name the major groups of micro organism cause for the food spoilage.
10. Describe the process which the oil and fat rich foods become rancidity.
11. Although the fibers contain in a food does not important to nutrition, It gives a large contribution to manage physical health. Explain the above statement with examples.
12. what is food standardization ? Explain why a country needs to maintain the food standards?

## **16. Eco-friendly agriculture**

1. Describe the importance of using perennial crops in street crop cultivation system.
2. Describe the effect of mono crop cultivation to the environmental balance of an agricultural land.
3. Describe the methods of using agricultural wastes in the productive way.
4. Describe crop rotational farming methods and state the advantages of that.
5. Describe differences in interim crop cultivation and the mixed crop cultivation.
6. "Chena cultivation destroys the environment". Prove this statement.
7. Describe the factors to be considered at the selection of crops for a mixed cropping.
8. "Agri-forestry is a farming method to maintain the environmental balance". Give reasons for it.
9. Describe special characteristics of conventional Kandyan upcountry home gardening and environmental benefits receives from that.
10. Describe how the environment friendly pest control occurs as a result of crop rotation.

## **17. Agri Economics**

1. When a consumer have a constant income he selects the combination of goods up to maximum utility level. Explain the above incident assuming the prices of goods are constant.
2. Describe the importance of preparing a business plan for a business.
3. Describe the importance of proper maintenance of records in a farm.
4. Describe production stages.
5. Describe the methods that can be used to improve the labour productivity.
6. Describe the various factors that affect the demand for a product.
7. Describe the problems related to the agricultural product marketing.
8. Describe the factors that affection the price elasticity of demand of a product.
9. Describe various production costs.
10. Describe the features of traditional agricultural marketing.

# **ESSAY TYPE QUESTIONS - ANSWERS**

## 1. The Development of Agriculture in Sri Lanka

### 1. Defining Green revolution

#### Adverse effects

- Land degradation in agriculture during the last few decades was greater than the land degradation that occurred in the last few centuries.
  - Natural resistance of a plant deteriorate when plant breeding for increasing harvest.
  - Emergence of resistful insects due to excessive usage of pesticides.
  - Spreading of pests attacks as an epidemic in the certain periods.
  - Environment pollution due to excessive usage of agro-chemicals.
  - Emergence of new health issues due to water pollution, soil pollution and air pollution as a result of excessive and inappropriate chemical usage.
  - Very low level of ground water due to the consumption of ground water extensively.
  - Crops varieties that effectively respond to fertilizer cannot be grown without fertilizer .
- 2.
- Back-dated technology - Introduction of new technology.
  - Failure to reach the maximum potential yield -Improvement of the local gene pool.
  - Fluctuation of price in the agricultural goods - taking suitable action to pervent the fluctuation of price.
  - Unfavorable climatic conditions - Cultivation crops under the controlled conditions.
  - Weaknesses in extension services - Expansion of extension services.
  - Food item import - Local Production of economically, environmentally and socially valuable crops.
  - Decrease of land area per head - Increase the efficiency of the land use.
- 3.
- More support from the government for the paddy cultivation - Supplying fertilizer, giving subsidies, introducing certified price, introducing agricultural Insurances.
  - Develop irrigation systems.
  - Conducting Agriculture research.
  - Expanding agrarian services - Suppluing fertilizer, Agriculture loan services, input services
  - Increasing utility of agricultural lands.
  - Improving quality of the work force.
  - Creating food security in the country.
- 4.
- Population redistribution.
  - Increasing employ ability as a result of creating new job opportunities.
  - Self sufficiency and Food security.
  - Improvement of the nutritional level of the population and Making a healthy population.
  - Establishment of new economic centres.
  - Providing lands to the people who do not have lands.
  - Increase in demand for agriculture inputs.
  - Emergence of new industries as a result of implementation of hydropower.
  - Improvement of infrastructure facilities.
  - Reduction of import costs due to the increase of local agricultural products.

5.
  - Existence of a culture closely connected to agriculture.
  - Conventional knowledge on agriculture.
  - Main livelihood of rural community.
  - Provision of subsidies for cultivations and implementation of government policies.
  - Establishment of Food security.
  - Providing inputs for the industrial sector.
  - Rich in agri-bio diversity.
  - Export of agricultural products.
  
6.
  - Developing local agricultural products to ensure food and nutritional security of the nation.
  - Assuring sustainable development and improvement of agricultural productivity.
  - Improving living standard of the agriculture community and creating lifelong stability.
  - Improving capacity of farm production by reducing production cost.
  - Minimizing adverse effects of globalization of local and export agriculture by measuring favorable effects of them.
  - Improving export agriculture and establishing sustainability.
  - Improving agriculture based industries to create new job opportunities.
  - Using improved agricultural technology and productive farming methods with the aim of reducing per unit production cost and earning greater profits.
  - Helping for the improvement of entrepreneurship and investment of private sector based on agricultural field.
  
7.
  - Irrigating more cultivable land area by implementing irrigation projects and repairing irrigation structures.
  - Cultivating both seasons.
  - Time management by mechanizing farm land.
  - Introducing new varieties that give more harvest.
  - Taking steps to minimize post harvest losses through the introduction of various modern machineries and methods.
  - Expanding extension services.
  - Implementing the certified price for paddy.
  - Creating positive attitudes towards cultivation and consumption.
  - Distribution of high quality seed paddy among farmers.
  - Government sponsorship.
  
8.
  - Providing agriculture related jobs.
  - Earning foreign exchange by exporting agriculture products.
  - Emerging industries which produce agriculture inputs.
  - Emerging Agricultural construction industry.
  - Emerging transport services related to the transportation of agricultural products.
  - Establishing agriculture maintenance services.
  - Establishing agriculture marketing services.
  - Earning through Agro-Tourism industry.

9.
  - Agri product processing
  - Producing inputs for farmers
  - Importing and distributing agri goods.
  - Creating food security
  - Providing necessary knowledge to farmers
  - Earning foreign exchange by exporting agri products
  - Distribution of agricultural inputs by coordinating with state organizations
  
10.
  - Availability of agri land
  - Environmental and climate condition is good for cultivation
  - Availability of agri related jobs
  - Availability of man power
  - Have Agri project services
  - Conduct agricultural reserh by Agri reserche Institutes
  - Support from the government
  - Have developed irrigation system
  - Support from Privet sector, NGOs and Acadamic Institutes

## 2. Effect of climate on crop cultivation

### 1. Define climate factors

#### Climata factors

1. Light
2. Temperature
3. Rainfall
4. Wind
5. Relative Humidity

#### Effect of light

- Light intensity – To the rate of photosynthesis  
To tillering
- Quality of light – Green light – to form leaves  
Yellow light – flowering
- Duration of light – Flowering  
To the growth of tubers (under ground stem)

#### Effect of wind

##### Adverse effects

- Spreading pests and diseases
- Having mechanical damages
- Falling immature fruits and flowers
- Decreasing surface photosynthesis

##### Favourable effects

- Pollination flowers by wind
- Providing CO<sub>2</sub> for photosynthesis

#### Effect of Relative humidity

##### Favourable effects

- Rooting of stem cuttings
- Increasing the quality of flowers such as Anthurium & Orchid.

##### Adverse effects

- Spreading of pest and diseases
- Disturbance in dispersion of pollen and pollen grains

#### Effect of Rainfall

##### Effect of high rainfall

- Soil become infertile due to soil erosion
- Occurrence of mechanical damages

##### Effect of optimal rainfall

- Obtaining water required for photosynthesis
- Germination of seeds

2. Reasons for the changes in environmental temperature in different regions

- Elevation
  - When the elevation rises up the environmental temperature will decrease.  
When the elevation rises up 1000 meters the environmental temperature reduces by 6.4°C.
- geographical location
- Density of flora and creepers  
When the density of flora and creepers increases in an area, the environmental temperature decreases.
- Human activities  
Human activities such as urbanization increase the temperature.
- Location of internal reservoirs  
The buffering action made by large reservoirs leads to reduce the surrounding temperature
- Distribution of rainfall  
Decrease in environmental temperature in the areas having high rainfall distribution.

3. Define Rainfall

Rainfall mechanisms in Sri Lanka

1. Monsoonal rain – South West and North East monsoonal rains
2. Convectonal rain
3. Weather systems

South West monsoonal rain

- Occurs due to the effect of South West monsoonal wind
- Active from the third week of May to the end of August or first week of September
- Rain occurs in the South West region in the island
- Dry hot wind in Eastern and North West regions in the island  
Supply water for farming practices in the Yala season

North East monsoonal rain

- Occurs due to the effect of North East monsoonal wind
- Active from the third week of November to February
- Supply water to huge area including Eastern province
- Amount and the intensity of rainfall are low
- Provides water for the Maha season

Convectonal rain

- It occurs between two monsoon seasons, therefore it is defined as convectonal rain  
March-April – the first inter monsoonal rain  
October-November – the second inter monsoonal rain

## (A/L) Agricultural Science - Essay Questions and Answers

- During this period, from morning to mid day a blue colour sky and free of clouds can be seen
- During this period due to high solar radiation, warm air overrides colder air, then masses of air saturated causing precipitation.
- Free convectonal air flows occur and the air flows rise up in the middle part of the country
- Growth of cumulus rain clouds in high lands
- Occurrence of rain in upcountry areas around 2 pm
- Occurrence of rain in coastal areas in the evening
- Able to see a clear sky without clouds in the night

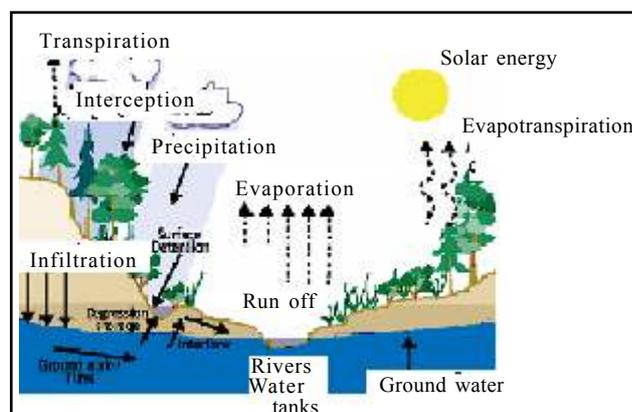
### W eather systems

- Occurs due to the changes in the atmospheric pressure
  - W eather systems are created in the areas surrounding the Bay of Bengal.
  - W eather systems are three types on the basis of the wind-speed
    1. Disturbance in low level atmosphere or low pressure area
    2. Depressions
    3. Cyclones
4. Relationships between the rainfall pattern and the growing seasons are given below .
1. First inter monsoonal rain – March-April
  2. South W est monsoonal rain – May-September Y ala season
  3. Second inter monsoonal rain – October-November
  4. North East monsoonal rain – November-January Maha season

According to this,

- The time duration from March to August identifies as Y ala season
- The first inter monsoonal rain and the South W est monsoonal rain provide active contribution to the Y ala season
- For Maha season,  
The second inter monsoonal rain and the North East monsoonal rains provide active contribution.

### 5. Define Hydrologic Cycle



**The Hydrologic Cycle**

**(A/L) Agricultural Science - Essay Questions and Answers**

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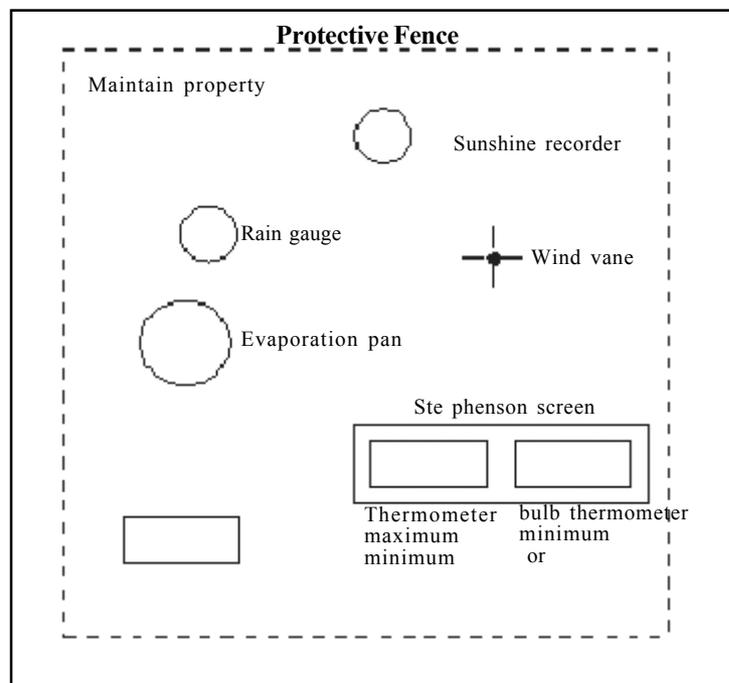
- Adding water vapor to the atmosphere by evaporation and transpiration.
- Forming clouds in upper atmosphere by condensation at low temperature.
- Rainfall falls from these clouds.

6. Define Agricultural Meteorological Unit

The factors should be considered when selecting a suitable location.

- A location represent the area
- It should not close to ponds or reservoirs
- It should be well drained and flat land
- Should be away from four times the height of trees and buildings
- A place where can be easily reached
- The area of the site should be 10 m × 10 m

7. Define the Agricultural Meteorological Unit



**Rain gauge**

- Installed on a concrete platform
- Keep the top end of the rain gauge 30 cm above from ground surface
- 1.5 m distance from the protective fence

**Soil Thermometer**

- Install soil thermometers in 5,10,20,30,100 cm depth

**Anemometer and wind wawe**

- Install the anemometer two meters above the ground level
- Should not have wind barriers

### Evaporation pan

- Placed on a wooden frame of 15 cm height
- Should be covered using wire mesh
- Place 1.5 m away from the rain gauge
- Installed 1.5 m away from the fence

### Thermometers and Humidity meters

- Install in the Stephenson Screen

### Sunshine Recorder

- Install on a 1.5 m height concrete tower
- Set through the direction of East to West

## 8. Define green house effect

Contribution of natural green house effect on the agricultural activities

- Since there is a regular rainfall pattern crop cultivation can be done according to the cropping season.
- Since there is not variability in rainfall, adequate amount of water is received for crop cultivation, therefore crop cultivation can be done successfully.
- Since there is no temperature variabilities, reduction of yield by qualitatively and quantitatively would not occur.
- Since hydrologic cycle functions properly, there is no problems such as excessive droughts, over flooding.
- As a result of having optimum temperature and relative humidity, there is a better plant pollination, no need to face water deficits, minimizing harvest losses and no pests and diseases damages.
- Reducing spreading of invasive weeds which compete with crops.
- Increasing yield of tuber crops as the temperature during night is not abnormally high.
- Regular rainfalls and less temperature fluctuation leads to increase availability of food for animals which support to increase the production of animals.

## 9. Define climate changes

### Adverse effects

#### Effects of rainfall fluctuations

- Unable to do crop cultivation on particular seasons due to change of rainfall pattern.
- Crop cultivations are destroyed because of high rainfall and droughts.
- Because of high rainfall, soil erosion increases and it leads to destroy crops and soil fertility.
- High rainfall in harvesting season leads to post harvest losses.
- Frequently cloudy sky reduces the intensity of light and it leads to decrease the harvest.

Effect of temperature fluctuation

- As a result of increasing of temperature, having sterile spikelets and reducing yield.
- Spreading of invasive weeds.
- The condition of water deficit occurs.
- Occuring elnino and lanino conditions.
- Decreasing the yield of tuber crops.
- Increasing pest and disease.
- Shorten the lifespan of crops.
- Reducing animal products.
- Due to the increase of sea water level decreasing quantity of arable lands.

10. Define climates changes

Strategies can be adopted to minimize.

- Use irrigation systems having minimum water use, such as drip irrigation, sprinkler irrigation.
- Regulation of irrigation after reconstructing water tanks, anicuts stream/canals and dams.
- Collect and use rain water using rain water tanks.
- Using of soil and water conservation methods.
- Cultivating crops suitable for agro-ecological zones.
- Introducing new varieties, suit environment area.
- Producing varieties, such as salinity torence, drought tolerance and pest and disease tolerance by breeding methods.
- Reducing percentage of carbon dioxide of the environment by forestation.
- Acting to conserve the environment and creating public awareness.
- Following eco-friendly farming systems such as organic farming, conservative farming.
- Minimizing the use of agro chemicals.
- Reducing in crop cultivation, after recycling of waste water .

### 3. Soil factors affecting crop cultivation

1. Define the word 'Rock'

Three main types of rocks

1. Igneous rocks
2. Sedimentary rocks
3. Metamorphic rocks

#### **Igneous rocks**

They are formed by the cooling and solidifying of magma. They can form beneath the earth surface or at its surface as lava.

Eg. Granite, pegmatite, Charnokite

#### **Sedimentary rocks**

They are formed by the deposition of soil mineral which is translocated by water and wind to another place. Then it is compacted and bond with binding materials to make as strata.

Eg. Lime, Dolomite, sand stone, clay stones

#### **Metamorphic rocks**

They are formed from translocation of existing rock type by the earth movements. Then igneous and sedimentary rocks are subjected to sink and subjected to change in nature by high temperature and high pressure.

Eg; Marble, Slate, Gneiss

2. Physical weathering of rock  
without changing its chemical composition rocks are breaking into small pieces.

#### **Factors affecting physical weathering**

- The speed of flowing water  
Rock particles hit each other and break into small pieces
- Waves of the sea  
Rocks on the beach are broken into small pieces.
- Freezing of water  
In the cold climatic regions rock cavities are filled with water. Then it freezes and exerts a pressure on the rock which breaks the rocks into small pieces.
- Wind of high velocity  
Sand storms that appear in the desert regions break the rocks into pieces.
- Fluctuation of Temperature  
Unusual expansion and contraction cause rocks to break into pieces.

3. Define the soil profile -

O	organic matter zone
A	eluvial zone
B	aluvial zone
C	parenting material
R	unconsolidated parent rock

- O - contains the organic matter .  
Humus is formed by the decomposition of organic matter .
- A - It is called the eluvial zone  
Minerals are leached out from the horizon A
- B - Aluvial zone  
Minerals leached out from horizon A. is accumulated in the horizon B
- C - This is called the regolith. It consists of parental material formed by rock weathering
- R - It contains unconsolidated parent rock beneath the soil

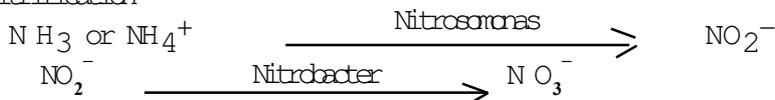
4. Functions done by soil bacteria

soil bacteria is type of soil organism. the functions that are carried out by soil bacteria are as follows

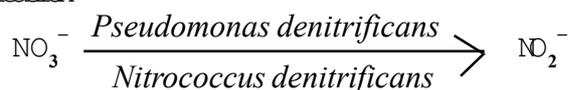
- Amnification



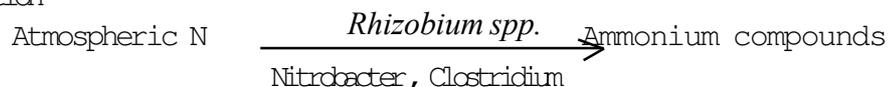
- Nitrification



- Denitrification



- Nitrogen fixation



5. The water which retains in the pore spaces in the soil and tightly binds to the soil particles is named as soil water .

Phenominas which effect to retain water in soil

- Activating and cohesive forces  
Adhesive forces which are in between soil and water particles and cohesive forces which are in between water and water particles, leads to retain water in soil
  
- Capillary forces  
Retains water in capillary pores in the soil by capillary forces
  
- Surface tension  
Although having strong adhesive forces between water molecules and soil particles, no such strong binding effect between water molecules and air .Therefore water molecules in the surface, stretched and active as a thin elastic film. So water drops having round shape. These round shaped water drops retain among soil particles.
  
- Polarity of water  
W ater molecules are bound around clay micelles since the electro static binding of the water molecule.

6. Type of classification.

1. Physical classification.

- Gravitational water – water which weakly bound in the pore space.  
– Retain in the macro pore spaces.  
– Plant cannot use
  
- Capillary water – The water retain in the capillary pore spaces.  
Not bound to the soil particles strongly .  
Plants can easily obtain.
  
- Hygroscopic water – The water which strongly bound to soil particles and colloidal surface by adhesive forces.

2. Biological classification

- Unavailable water for plants.
  - Include hygroscopic water
  - pF value more than 4.2
  
- Available water for plants
  - W ater between the field capacity and the permanent wilting point.
  - pF value between 2.2-.4.5 range.
  
- Excess water
  - W ater between saturated point and field capacity .
  - pF value from 0 to 2.5.

7. Define soil structure

**Types of soil structures.**

1. Granular – Small granules the diameter of a particle is about < 0.5 cm. Mostly they can be seen on the upper surface of the soil profile where the root system is situated.
2. Blocky – diameter of a particle is 1.5-5.0 cm which consists with the shapes of angular blocky and sub angular blocky .
3. Prismatic – They can be seen in the soil as vertical prismatic columns found in lower layers of the soil profile.
4. Columnar – They can be seen as vertical form columns.
5. Platy – Form thin flat plates in soil horizontally as separated layers.
6. Single grains – Single grains which are not bound each other . Mostly they can be seen in sandy soil.

8. Define soil structure.

**Techniques which can be applied**

- Addition of organic matter to the soil
- Improving drainage
- Applying soil conservation methods
- Cultivating rehabilitation crops
- Cultivating crops correctly

9. Define acidic soil

**Problems**

- Weakening crop growth
- Toxicify to root system
- Weakening the absorption of ions such as  $Ca^{2+}$  ,  $Mg^{2+}$  and  $K^{+}$
- Weakening the processes such as Nitrification Carbonization.
- Spreading of some pathogenic micro organisms.

10. Define Soil Erosion

Types of Soil erosion

1. Splash erosion – This is the initial stage of soil erosion. Removal of soil particles with rain splashing drops after rain drops falls on the earth.
2. Sheet Erosion – Washing out the layer of soil with the remaining water on surface of the sloppy earth. Then the gravel and stone which is under the surface soil layer emerges.
3. Rill Erosion – Obstructing the pores in the soil after the removal of the surface soil layer . Formation of rill through the run of f water .
4. Gully Erosion – When rill erosion occurs continuously, tiny rills becomes gillies.

11. Define soil conservation.

Mechanical methods.

The main purpose of this method is to reduce the speed of run-off water .

1. Digging drains along the contour lines

Two types of drains

- Main drains

- Lateral drains

2. Construct soil bunds along the contour lines

3. Construct terraces

4. Construct stone bunds

12. Define soil rehabilitation.

Agricultural practices

- Minimum and zero tillage
- Planting crops along contours
- Planting wind barrier trees and hedges
- Use organic manure.
- Follow improved farming methods
- Minimize usage of weedicides
- Cultivating pulse crops.
- Improve the drainage of soil.

## 4. Plant Nutrition

1. Define organic fertilizer

Improvement of physical qualities

- Improving soil structure
- Improving soil aeration
- Increasing soil water absorption capacity
- Increasing soil water holding capacity
- Decreasing visual density
- Having dark colour in the soil and it produces sufficient temperature for soil microbial activities
- Reducing soil resistance

2. Define organic fertilizer

### Advantages

- Improving soil structure.
- Improving cation exchange capacity of the soil.
- Prevent formation of toxicity in plants
- Improve water absorption.
- act as a buffer .
- Inclusiveness of lot of nutrients.
- Increasing in microbial activities.
- Decrease in soil erosion
- Prevent shell formation on the surface of the soil
- No need to apply skilled labours.

3. Define the balanced fertilizer

### Importance

- Increase of fertilizer use efficiency.
- Increase quality of crop yield.
- Increases nutrients in crop residues.
- Minimize opposite reaction among nutrients.
- Decreases usage of pesticides, therefore healthy food can be produced.
- Reduce adverse effects that can occur due to wasted fertilizer.

4. Define plant nutrients

### The methods of removing plant nutrients from the soil

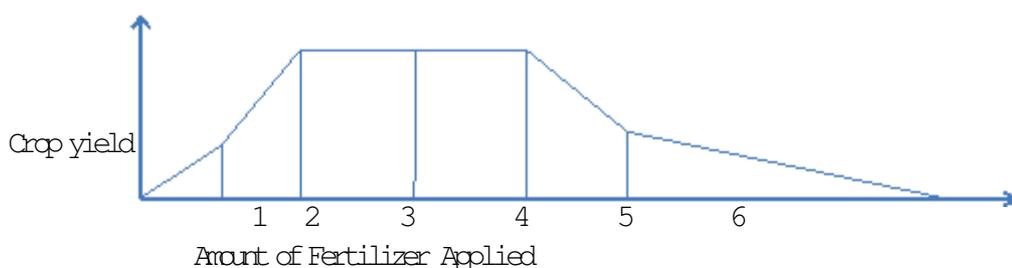
- Absorption by crops
- Soil erosion
- Leaching
- Evaporation
- De-nitrification
- Nutrient fixation
- Absorb by microbes and weeds

**(A/L) Agricultural Science - Essay Questions and Answers**

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5. Explain improper fertilizer usage  
 problems due to improper fertilizer usage
- Unfavorable chemical reactions in the soil
  - Weakening of soil microbial activities
  - Less nitrogen fixation in leguminous crops due to excess fertilizer containing nitrogen
  - Comparatively higher cost
  - More susceptible to pests
  - Water and soil pollution
6. Percentage of Nitrogen in the mixture = 15%  
 Percentage of nitrogen content in the Ammonium Nitrate = 34%  
 Nitrogen content in 1000 kg of the mixture =  $15/100 \times 1000$   
 = 150 kg  
 Required weight of Ammonium Nitrate to produce 150 kg of N =  $100/34 \times 150$   
 = 441 kg
- $P_2O_5$  percentage of the mixture = 10%  
 Percentage of  $P_2O_5$  percentage of TSP is = 45%  
 $P_2O_5$  in 1000kg of the mixture =  $40/100 \times 1000$   
 = 100 kg  
 Required TSP to get 100kg of  $P_2O_5$  =  $100/45 \times 100$   
 = 222 kg  
 Total weight of two types of fertilizer to be mixed =  $(441 + 222)$  kg  
 = 663 kg  
 Weight of the supplement to be added to make the mixture 1000kg =  $(1000 - 663)$  kg  
 = 337 kg

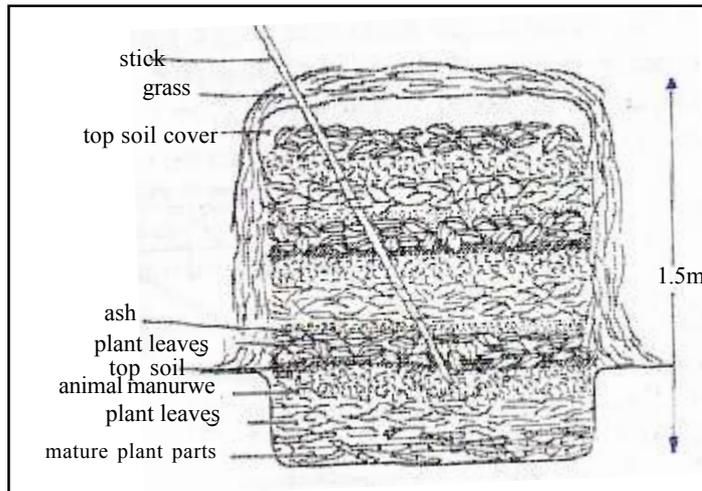
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- Zone 1 – The plants are facing a severe deficiency . High responsiveness to the applied nutrients
- Zone 2 – The slight deficiency . Response to the nutrients
- Zone 3 – Nutrients have received at optimum level. Maximum growth and yield are shown
- Zone 4 – The yield not increased by nutrients
- Zone 5 – Toxicity in the plant due to the excess amount of nutrients. The yield decreases
- Zone 6 – High toxic action to the plants due to the application of very high amount of nutrients

8. Defining compost

Process



- i. Collecting suitable raw materials to make compost  
Examples should be provided
- i. Chopping organic matter  
Reduce surface area and increase microbial activity
- ii. Preparation of initial mixture for compost
  - Preparation of the solution by mixing old compost, raw cow dung etc with water
  - Introducing microbes to expedite decomposition of compost is an objective of this step.
- iv. Packing compost pit or the heap
  - The compost layers are packed lightly one by one and initial mixture is sprayed on packed layers
- v. Covering the compost heap
- vi. Inserting a pole to the middle of the heap
- vii. Turning of the heap

9. Defining efficiency in usage of fertilizer

Strategies

- Apply a liquid fertilizer with 1% concentration on the plant leaves.
- Apply recommended fertilizer.
- Apply fertilizer after it reaches field capacity.
- Apply organic and inorganic fertilizer mixture.
- Apply fertilizer according to the growth stage of the crop.
- Apply recommended fertilizer amount in several times without putting at once.
- Correct the pH value of the soil before applying fertilizer.

10. Affect of soil characteristics on soil nutrient availability

Soil characteristics

1. pH value of the soil

- Macro elements are common within the range of pH value 6.5 – 7
- When the soil pH is less than 4 solubility of minerals such as Aluminum, Iron and Manganese become toxic to the plant
- When the pH value is higher than 9 solubility of Ca and Na increases

2. Soil colloids

- When soil has clay and organic colloids, leaching of soil nutrients is prevented by soil colloid complexes and can absorb to the plant by adsorbing\
- Reduces toxicities of toxic metals such as Pb and Cd by reducing its availability by adsorbing it to the colloids

3. Soil texture

- Water and nutrient ions are collected by clay particles

4. Soil moisture

- Roots grow properly when moisture is available.
- Nutrient adsorption occurs properly. Nutrient adsorption occurs when the pH is in the range of 2.5 – 4.2

5. Soil air

- When soil air is weak, certain nutrients are destroyed. Eg: De-nitrification

6. Soil temperature

- Soil temperature affects soil nutrient absorption. Maximum nutrient absorption occurs at 24 – 33°C

## 5. Land Preparation

1. Explain the requirement of nursery plant production

Requirement of nursery plant production

1. To get healthy, hardy plants suitable to be established in the field
2. To get a uniform plant population
3. Establishment of selected, healthy plants to get economic benefits.
4. Less expenses for seeds since the amount of seeds wastage is less
5. Ability to get more plants from less space
6. Reduce time gap between two seasons
7. Minimize seasonal crop losses
8. Easy to maintain

2. Describe sand nursery

Preparation of a sand nursery

- i. Construct bricks walls around the planting bed so that the nursery dimensions are 1m in width and 3 m in length.
- i. Fill with sieved river sands and level
- ii. Plant seeds with correct spacing
- iv. Cover with a thin sand layer
- v. Put a mulch on it
- vi. Watering
- vii. Potting the plants when two seed leaves are emerged

3. Defining plant hardening

Hardening of plants

- i. Increase the irrigation period
- i. Reduce amount of water applied
- ii. Remove shelter gradually
- iv. Increase number of hours exposure to sunlight per day
- v. Complete removal of shade within last few days

4. Describe the maintenance of nursery plants.
1. Water management
    - Providing water in correct amounts, correct pressure and at the correct time
    - Good quality water
    - Decide on the amount of water to be applied based on the soil moisture content, evaporation-transpiration requirement
    - Decide on the correct irrigation method
  2. Nutrient provision
    - Application of organic or inorganic fertilizer
    - Maintenance of pH value at the correct level
    - Application of fertilizer based on the soil nutrient requirement
    - Use of fertilizer containing Nitrogen or phosphorus as top fertilizer
    - Application of fertilizer with irrigation
    - Mostly use liquid fertilizer mixtures
  3. Providing shade
    - Use to protect from high light intensities
    - To maintain humidity at a specified level
  4. Pest control
    - Important to pay attention to the nursery
    - Use mechanical methods as much as possible to control pests
    - Integrated pest management is more suitable
  5. Hardening of plants
    - Plants are prepared to withstand field conditions
5. Define land preparation
- Steps of land preparation
- Primary land preparation

Loosening of hard soil or turning of the soil is done here. In addition to that weeds and stubbles are removed and the soil surface prepared with less large pebbles.
  - Secondary land preparation

After primary land preparation light and fine soil preparation activities and secondary land preparation methods. Grinding of large pebbles, removal of weeds and stubbles and leveling of soil is done here.
  - Preparation of beds

Preparation of different structures suitable to establish plants or seeds and irrigate after preparing the land. According to the type of soil and different incidents the type of planting beds vary.
  - Post land preparation

Define post land preparation and give examples.

- | 6. | <b>Disc plough</b>                            | <b>Disc plank</b>                                |
|----|---|--|
|    | 1. One disc row is fixed to the axis.         | 1. Two disc rows exist                           |
|    | 2. Activate by fixing to a four-wheel tractor | 2. Activate after fixing to a four-wheel tractor |
|    | 3. not suitable for stone abundant soil       | 3. Used for rubbles turned by plough             |
|    | 4. Use for turning the soil                   | 4. Use to breaking rubbles in the soil           |
|    | 5. Large discs                                | 5. Small discs                                   |
|    | 6. Fewer number of discs                      | 6. More discs                                    |
|    | 7. Discs are rotated individually             | 7. All discs are rotated together with axle      |

7. Explain planting seeds in a field  
Different methods of seed planting

● **Unorganized methods**

- Sowing of seeds
  - Uniformly dispersing seeds in a finely prepared land is seed sowing.
  - Kurakkan, Meneri, Mustard, Green gram and Ginger seeds are sown.

● **Organized method**

- Planting seeds
  - Planting seeds in the holes at recommended spacing
  - Seed planting using seeders

Different planting methods

- Establishing plants after preparing the land at a suitable place
- Name different methods of plant establishment
  - Unorganized method
    - Random planting – digging holes randomly to establish plants
    - Throwing plants – Used in the paddy cultivation
  - Planting in row method
    - Planting by hand or using equipment
      - Single row planting – Show with diagrams eg:- Planting paddy plants with machines
      - Double row planting – Describe with diagrams eg: Pineapple
      - Triangular planting – Describe with diagrams eg: Fruits
      - Square planting – Describe with diagrams eg: Coconut, Rubber
      - Pentagon type planting – Describe with diagrams eg: Papaya
      - Hexagon type planting – Describe with diagrams eg: Banana

8. Types of primary land preparation

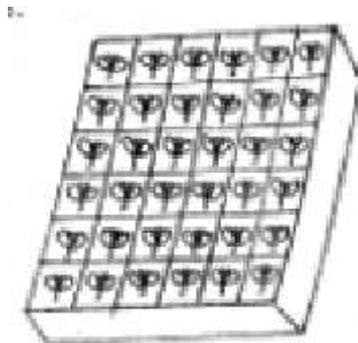
- Deep tillage – Tillage to a depth of 25-30cm or deeper is called deep tillage. Soil structure will improve by breaking it into smaller pieces by exposing it to sunlight and rainfall. Deep tillage is useful to control weeds with perennial main roots
- Loosening of sub soil – Hard layers are formed as a result of tilling the soil to a same depth.
- Continuous land preparation throughout the year – Land preparation is done throughout the year. Soil is prepared again and again to avoid hardening of soil as a result of increase in the time gap between crop establishment period and primary land preparation.

9. Define land preparation

Objectives:

- To improve soil texture
- To improve soil aeration
- To improve water absorption capacity
- To improve water drainage
- To control weeds
- To control pests

10. Define Noridoko nursery



- Sieve top soil and decomposed of gann matter separately.
- Mix sieved top soil and organic matter in 1:1 ratio
- Mix water to the mixture and prepare it to a paste
- Putting the paste into a wooden frame of 5cm height and level it.
- Cut the paste into 5cm X 5cm pieces
- Plant one seed each on these pieces
- Mulch with a wet gunny bag.
- When seeds are germinating remove the mulch and provide space for germination

## 6. Irrigation and Drainage

1. Defining poor drainage

Methods of identification

- If there are different coloured patches (rust colour) in a soil, it is a poorly drained soil.
- Pour water into a pit of 30cm x 30cm x 30cm dimensions. If water is gets collected in it, drainage is very poor. If water does drain completely within an hour, the drainage of water in the soil is very poor. If water drains successfully within an hour the drainage of the water is in the satisfactory level.

2. Defining the water pump

Factors to be considered

- Type of the water pump
- Issuing rate
- Suction head
- Releasing head
- Portable or fixed
- Activation force: electricity/fuel
- Price of the water pump
- Service concessions
- Availability of spare parts
- Easy to maintain

3. Defining irrigation

Objectives

1. Facilitate land preparation
2. Optimize crop growth
3. To provide moisture for the seed germination
4. Facilitate harvesting of tuber crops
5. To control weeds
6. To apply nutrients
7. To control pests
8. To remove salinity in soil.

4. Soil factors

1. Soil texture
2. Soil structure
3. Depth of the soil
4. Topography
5. Soil moisture content

Climatic factors

1. Rainfall
2. Temperature
3. Wind speed

Crop factors

1. Type of Crop and variety
2. Growth stage of the crop
3. Plant population
4. Duration of crop in the field
5. Cropping season

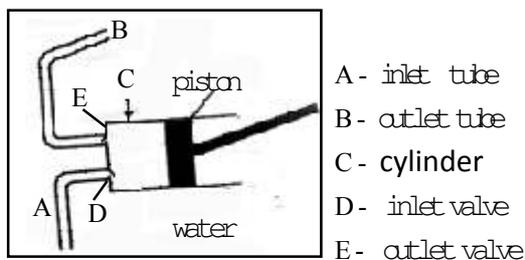
5. Defining irrigation

Factors to be considered

1. Ability to fulfill the water requirement of the crop in the field
2. Ability to obtain water at required times
3. Quality of water and being free of impurities
4. Cost required for preparing water sources and to bringing water to the field
5. Compatibility of the water source with the existing irrigation method.

6. Describe the operation of the piston type water pump

Lifting of water that was pulled to a mechanically created vacuum chamber .



Operation

- Volume in the tube is increased by pulling the piston to outside.
- Then water inlet valve opens and outlet valves closes
- Water enters from water source to the water tube
- Water enters until the pressure inside the tube equals atmospheric pressure
- When the piston is pushed into the tube volume decreases and pressure increases.
- Then inlet valve closes and outlet valve opens.
- The water inside the tube is pushed out through the outlet valve

7. Defining surface irrigation

Methods of surface irrigation

1. Uncontrolled irrigation

- Allow free flow of water to inundate the whole land.

Eg: Paddy cultivation

2. Controlled irrigation

- Basin method

Divide the area into round or square shaped parts by ridges.

Fill up the basins with water . Eg: Fruit plants

- Ring method

Provide water along circular ditches prepared around perennial fruit trees such as Mango and orange. Water is stored until it has infiltrated the soil.

- Ridge and furrow method

Land is prepared in the ridge and furrow method and water is supplied through the furrow and crop is planted on the ridge.

Eg: Tuber crops

When water is scarce water is supplied to alternative ridges

- Strip irrigation

Land is divided into long and parallel strips by preparing short ridges so that water can flow along strips.

Amount of water should be reduced at the lower end of the strips

Eg: Suitable for legume crops and crops such as barley , wheat

8. Define drainage

Drainage methods

1. Surface drainage method

2. Sub surface drainage method

- Surface drainage methods

Drain water from the earth surface by constructing different structures

Eg: Open drains, drainage wells

- Subsurface drainage

Different structures are laid inside the earth and the water collected in it is removed from the field. Eg: tile drains, stone drains, bury porous pipes, brick drains

**Advantages and disadvantages of subsurface drainage**

**Advantages**

Easy to mechanize the field  
Can apply to any soil type

**Disadvantages**

Soil pebbles block in the drains  
Technical knowledge is needed for preparing drains  
Capital expenditure is high

**Advantages and disadvantages of surface drainage (Open drains)**

**Advantages**

Primary cost of preparation is less  
Easy to maintain  
Need less technical knowledge

**Disadvantages**

Cannot apply to sandy soil  
Easy for farm mechanization  
Cultivable area is less  
Should be maintained after each rainfall  
Increasing the health issues (mosquito problem)

**Drainage wells**

**Advantages**

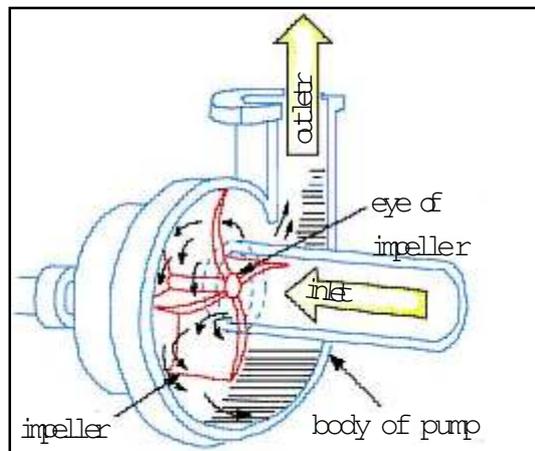
Can be used for the fields where other methods cannot be used  
Collected water can be used for other crops  
Collected water can be used for aquaculture or aquatic plant cultivation  
If the field is at a lower level of a slope this method can be applied.  
Easy to mechanization  
Increase in cultivable area

**Disadvantages**

Decrease the efficiency  
Removal of collected water from the field

9. Defining a centrifuge pump

Operation



- Rotating the impeller in a covered cage using an external force.
- Close to the centre, suction is created and a high pressure is formed at upper levels of the circumference due to the centrifugal force.
- Due to the suction formed at the centre, water can be pulled up from the water source through the suction pipe fixed at the centre.
- Pulled water moves from central axis to the circumference because of centrifugal force
- Thus water enter the circumference at high presure, it is pumped against by the gravitational force
- Since water is pulled using suction, it is essential to have a continuous water flow from water source to the pump. A valve is fixed at the end of the suction pipe.

10. Seeping of water as droplets, to the root system of the crop to maintain the soil close to the root zone at field capacity is drip irrigation

Advantages

1. Soil erosion does not happen since there is no surface water flow
2. Supply of water only to the root zone leads to considerable saving in water
3. The cost of this method is less than that of sprinkler irrigation
4. Crop growth and crop yield is high since the area around the root zone is always at field capacity .
5. Used energy is less since high pressure is not needed to apply water
6. The loss of water in evaporation is low .
7. Weeds are controlled
8. Suitable for slopy and high windy areas
9. Fertilizer can be mixed with water to be applied.

Disadvantages

1. The holes are clogged due to the presence of waste in the water
2. Plant cannot withstand in severe drought and stress, winds as their roots don'd reach deep.
3. Require advanced technical knowledge.
4. Cost is high.
5. Tolerance to high wind situations is less since roots do not grow deep.

## 7. Plant Propagation

1. definition of seed treatment

Treatment methods

- **For seed sterilization**

To avoid fungal and bacterial diseases the seeds are mixed with the pesticides

- **For covering seeds**

Pesticides and minerals are used to cover the seeds. Irregular and deformed seeds are well-formed by this

- **For removing seed dormancy**

Seed-coat scratching, soaking in diluted acids, soaking in hot water, soaking in normal water and stratification are done.

- **For hardening of seeds**

Seeds are acclimatized for harsh environmental conditions. Seeds are soaked in water till the hypocotyl comes out, then the seeds are dried after that those seeds are oaked and dried again.

- **For seed culturing.**

Legume seeds are mixed with a suitable *Rhizobium* strain before to ensure N fixation in the soil

2. **Advantages**

- When the plant cannot be propagated through vegetative means, then it is the only method of propagation
- To produce new cultivars
- To obtain root stocks for budding
- To obtain a large number of progeny from one mother plant
- To avoid bad environmental conditions as it inducing seed dormancy
- To distribute seeds in large extents of land
- Commercial cultivars of some crops have originated as chance seedlings
- The presence of apomixis in some species and cleistogamy in grapes can help in the production of true to type seedlings and thus propagation through seeds
- Plants produced by sexual propagation are hardy and have strong root systems

### Disadvantages

- Progeny is different from the mother plant,
  - The plants raised through seeds need much time for maturation (long juvenile period) than the vegetatively-propagated plants
  - Impossible to propagate seedless plants
  - Impossible to propagate in other seasons than fruit bearing seasons
  - The improved characteristics of a particular cultivar cannot be perpetuated in plants raised from seeds
  - Only a few trees can be planted in an when the trees are bigger. Thus in early years there is little yield per acre and in latter years trees shade each other producing poor quality of fruits.
3. Define viability

#### External factors

- Temperature – When seeds are stored at higher temperatures, the metabolic rate of the seed increases and it leads to the loss of viability
- CO<sub>2</sub> concentration - Seed viability increases with high CO<sub>2</sub> concentrations
- Relative humidity of the environment – Viability reduces with the increase of relative humidity
- Microbes and insects – Reduce seed viability
- Mechanical damage - Reduce seed viability
- Exposure to mutagens - Reduce seed viability

#### Internal factors

- Genetic factors - In some seeds the propagation period is determined. genetically.  
Eg; Oily seeds. Oily seeds lose viability fast
- The percentage of internal moisture content
- The factors that affect the seed development during the plant growth  
Eg; nutrients and water that a plant absorbs.

### 4. Defining seed dormancy

The factors that affect on induction of seed dormancy

#### 1. Characteristics of the seed coat

- Thick seed coat

resistant to water and water will affect the development of the embryo

Eg; Mango, Teak, Lunumedella

- Shiny seed coat

Eg; Tamarind, Red bead tree (Madatiya)

2. Chemical constituents in the seed coat or seed

Presence of inhibitors such as Kuraran and Kafilin acid in seeds of passion fruit papaw and tomato

3. Minimal grown embryo

Eg; coconut

4. Inactive embryo

Eg; Rice

5. Light sensitivity

Eg: Lettuce seeds

5. Defining tissue culture laboratory

basic setting up of a tissue culture laboratory

1. Cleaning room

Cleaning explants for tissue culture, cleaning instruments needed for tissue culture, Mention the tissue culture instruments in the area Eg. Water tap, autoclave, distilled water unit etc.

2. Media preparation room

3. Inoculation room:

Cut the explants according to necessity, inoculation of medium, Mention the instruments needed for inoculation room Eg: Laminar air floor

4. Propagation room:

Propagating plantlets are placed on shelves in this room Instruments and environmental conditions must be mentioned Eg: Fluorescent lamps, air conditioners, shelves for placing culture tubes

6. Defining micro propagation

Steps

1. Selecting and maintaining mother plant

- The purpose of selecting a mother plant for getting explants and maintaining the mother plants till the explants excision.
- Mention the considered factors in maintaining the mother plants.

2. Inoculation of ex-plant

- Live tissues can be used.
- The ex-plant surface must be sterilized, give examples

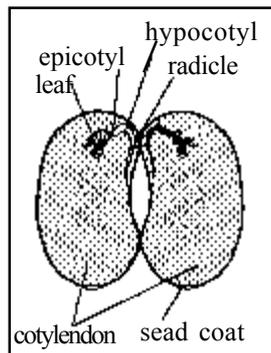
3. Multiplication/proliferation stage

- Let continuously multiply the buds. Then separate buds and sub-culture them.

4. Root induction

5. Hardening for external environment

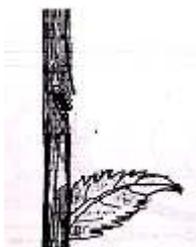
7. Define the seed



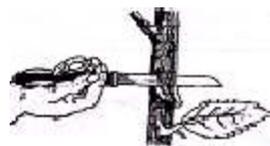
Draw and label a diagram of a typical seed

1. Seed coat - Protect the seed
  - Micropyle - Absorb water that needs for the seed germination
  - Hilum - scar on seed coat that marks the point where the seed was attached to the ovary tissue
  - Raphe - absorbs nutrients from the mother plant
2. Endosperm  
Accumulate the food needed for the embryo during the seed germination
3. Embryo
  - Plumule: Develops as the bud during seed germination
  - Radicle: Develops in to the root system
  - Cotyledon: Stores food in dicotyledonous plants

8. Defining layering  
Methodology



1



2



3

1. Branch impossible to bend down to the earth
2. Peeling off a ring on the stem
3. Cover the peeled off place with wet compost or wet coconut coir and cover it with a polythene

9. Define seed germination

Hypogeal germination	Epigeal germination
<ul style="list-style-type: none"><li>• During germination, plumule comes out of the soil and cotyledons and other parts remain under the soil</li><li>• Doesn't produce food through photosynthesis</li><li>• Most of the time can be seen in monocotyledonous Eg: Rice, coconut</li></ul>	<ul style="list-style-type: none"><li>• While the development of plumule, hypocotyl of the seeds develops fast and bends like a hook and brings the plumule and cotyledons out of the soil</li><li>• Cotyledons carry out photosynthesis</li><li>• Most of the time it can be seen in dicotyledonous plants Eg: Jack fruit, Mango</li></ul>

10. Defining seed testing

1. Purity testing
  - Finding physical and genetic purity of the seeds
  - In physical purity testing, pure seed percentage is calculated
2. Examine germination percentage
  - Petri-dish method, Ragdoll method and sand nursery box method can be used
  - Seed germination percentage =  $\frac{\text{Number of germinated seeds}}{\text{Used total number of seeds}} \times 100$
3. Examine seed viability

The following are tested to examine seed viability

- The percentage of seed viability
  - Measure CO<sub>2</sub> content
  - Tetrasolium test
  - Using X rays
4. Measuring moisture content

## **8. Plant Breeding**

1. Recombinant DNA technology is a series of procedures that are used to join the segments of DNA molecules (or genes) from two or more different species and the recombinant DNA molecules into a host organism to produce new genetic combinations that are value to science, medicine, agriculture.

Steps of recombinant DNA technology are:

1. Identification of the gene that has the required value
  2. Cutting and separation of the gene
  3. Multiplication of separated gene
  4. Insertion of the separated gene into a vector
  5. Insertion of the gene into the cells of the targeted plant
  6. Growing the plant in an artificial tissue culture medium
  7. Selection of the plants with inserted gene
2. Genetic resources conservation is the management of human use of genetic resources so that they may yield the greatest sustainable benefit to the present generation, while maintaining their potential to meet the needs and aspirations of the future generations

Importance of genetic resource conservation

1. Maintain genetic diversity within the gene pool
  2. Conserve genetic balance in the environment
  3. Protect favorable characteristics for future breeding programs
  4. Provide initial materials for biotechnology
  5. Protect mutants produced by mutations
3. The entire economically important genes in the population to which the organism belongs are referred as genetic resources.
    1. Changing of habitats of the living beings due to the building construction and the cultivation
    2. Maintains genetic balance in the environment
    3. Environmental pollution
    4. Introduction of new species into the environment
    5. Developmental projects
    6. Selling gene resources
  4. Genetically modified organisms (GMOs) can be defined as transgenic organisms (i.e. plants, animals or microorganisms) in which the genetic material (DNA) has been altered. It does not occur naturally by mating and/or natural recombination and it is done in a laboratory.

**Importance of MO**

1. Producing pest tolerant plants such as corn and soya bean  
A bacterial gene is taken from Bt bacteria, which produces a poisonous protein has been inserted into the crops (Cotton, Nicotine)
2. Herbicide tolerant crops - Soy bean, cotton, canola
3. Production of Golden rice  
Golden rice has been produced by transferring three new genes; two from daffodil (Narcissus pseudonarcissus) and one from a bacterium (Erwinia uredovora) to rice to produce precursor of Vitamin A, Beta carotene.
4. Production of Virus tolerant Papaya  
Deactivate pectin destructive enzyme
5.
  - Phenotypic ratio of  $F_1$  - yellow : white = 3 : 1
  - So,  $F_1$  must contain heterozygous alleles
  - Since all the plants produced yellow flowers, all the plants are heterozygous for this character
  - Since the phenotype in the heterozygous condition is dominant, yellow colour is dominant.
  - If the dominant allele is Y and the recessive allele is y, the genotype is Yy.
  - If genotype of  $F_1$  is Yy, parents produce gametes with Y and y alleles.
  - So, Yellow-flowered genotype is Yy and white flowered genotype is yy
6. A test cross is an experimental cross of an individual organism of dominant phenotype but unknown genotype and an organism with a homozygous recessive genotype (and phenotype) in order to understand genotype of the dominant phenotype.

**The way of examining genotype of an organism is a test cross**

In a plant, the dominant genotype produces purple colored flowers while double recessive genotype produces white-colored flowers.

When the Dominant allele is P and Recessive allele is p

The genotype of purple colored flowers is Pp or pp

In a test cross

Purple flowered plant X Homozygous recessive white colored plants  
? X pp

Genotype of purple colored phenotype

				If PP				If Pp	
Test cross	PP	X	pp			Pp	X	pp	
Gametes	P	P	p	p	p	P		p	p
	Pp	Pp	Pp	Pp		Pp	Pp	pp	pp

All are purple colored flowers      Purple colored flowers      White colored flowers

If homozygous dominant, all  $F_1$  plants are purple-flowered

If heterozygous dominant, Purple:White must be 1:1

7. Variation of alleles and genes both within and among populations is called as genetic variation

Causes of genetic variation

1. Change of ploidy level  
Sometimes, the same characteristic is controlled by several genes. These genes can make different combinations. This broadens the genetic variation.
2. Change the number of chromosomes  
Ex; Production of polyploids
3. Mutations  
Mutations can occur naturally or be induced artificially

8. Plant breeding is the purposeful manipulation of plant species in order to create desired genotypes and phenotypes for the specific purposes.

Objectives of plant breeding

1. To increase yield potential
  2. To increase the quality of the yield
  3. To produce tolerant plant for the unfavorable environmental conditions
  4. To develop pest and disease tolerant plants
  5. To produce new cultivars
9. Ex situ plant conservation is the technique of conservation of all levels of biological diversity outside their natural habitats through different techniques like aquarium, botanical garden, and gene bank.

*Ex-situ* gene conservation techniques

1. Seed banks
  2. Field gene banks
  3. Gene banks
  4. Botanical gardens
  5. Reforestation
10. Collection of superior plants from a field with a genetic variation is called selection

Steps of selection

- Selection of parental plants with the desired characters
- Induce self-pollination and avoid cross-pollination
- Enhance characters of the progeny by increasing homozygous allele pairs
- Select plants with the desired character in the progeny and use them as genitors for self-pollination
- Do selection in each generation and shelf them till the character expresses up to the desired level

## 9. Crop cultivation under controlled conditions

1. Defining crop cultivation under controlled condition

### **Problems that arise in crop cultivation under controlled conditions**

- Pollination does not occurred properly
- Requires advanced technological knowledge and experience
- Environmental pollution due to the disposed plastic containers, polythene etc.
- Confining only to high value crops
- Increasing cost
- Shedding of flowers

2. Defining crop cultivation under controlled condition

1. Market and market demand

Target market and demand for it

2. The crop expected to be cultivated
3. The climatic conditions of the area
4. Availability of raw materials used
5. The capital
6. Technical facilities

3. Defining crop cultivation under controlled conditions

1. The ability to cultivate crops without unfavorable environmental conditions
2. Protect crops from pest and diseases
3. Reduction or in losses due to physiological effects ( Deficiencies/ toxicity)
4. Increases quality of the yield since it is free from weeds
5. No need to apply pesticides or weedicides
6. Reduces post-harvest loss

4. Defining crop cultivation under controlled condition

1. Crops can be grown without unfavorable environmental conditions
2. The protected crops from pests and diseases
3. Ability to get yield within a short time period
4. Ability to get yield in off-season
5. Ability to get yield continuously
6. Possibility of rooting stem cuttings possible
7. Caring of budbed plants
8. Crops inherent to different climatic zones can be grown in any climatic region.
9. Controlling day time for the photo-sensitive crops
10. Adaptation of tissue cultured plants to the environment

5. Introducing the semi-propagating structures

Poly-tunnel

- Structure
- Receiving Environmental conditions/ benefits
- Suitable areas
- Advantages and disadvantages

Lath houses

- Structure
- Receiving environmental conditions/benefits
- Suitable areas
- Advantages and disadvantages

6. Defining crop cultivation under controlled conditions

- Problems related to the selection of propagator structures and construction technology
- Failure use using crop cultivation technology properly.
- Issues arising due to excess use of chemicals at times

Eg: Fungicides etc.

- Little capacity for investments
- Marketing issues
- High cost of inputs
- Environmental issues because of wastes

Eg: Polythene

7. Introducing soilless culture

- |                                       |   |                              |
|---------------------------------------|---|------------------------------|
| 1. Vertical cultivation bags          | } | Structures/raw materials     |
| 2. Horizontal cultivation bags        |   | Planted Crop                 |
| 3. Cultivation on beds and in ditches |   | Advantages and disadvantages |
| 4. Potting technology                 |   |                              |

8. Define soilless culture

1. A large area is not required
2. Cultivating in the same land continuously
3. No labour requirement for the intensive activities such as Land preparation and weeding
4. Decreasing the cost in irrigation
5. Ability to use when soil environment is limited
6. Attraction of new generation
7. Less soil borne diseases as a result of clean cultivation of land and soilless nature

9. Introducing soilless culture

Issues

1. Difficulty of doing soilless culture in an open environment and impossibility of expecting high yield from this.
2. Initial production cost is high
3. Restricted only to the small-scale cultivations and the high value crops
4. Environmental conditions in protected structures should be prepared to make it suitable for crops
5. Need the electricity
6. High maintenance cost
7. Need for high quality water
8. A few institutional facilities
9. High adverse results due to minor issues

10. Defining crop cultivation in protected house

1. Most of the foliage plants do not like sunlight and protected houses can provide the required environmental conditions.
2. Enhances rooting of stem cuttings
3. Easy to control pest diseases
4. Convenience of quarantine activities
5. Easy marketing as a result of potted/soilless culture
6. Ability to perform as a means of self-employment
7. Need minimum attention unlike other crop nurseries.

11. Defining crop cultivation under controlled conditions

Suggestion

1. Providing technical instructions
2. Developing extension services
3. Giving loan and insurance services
4. Developing methods of getting raw materials easily
5. Providing marketing and export market facilities
6. Giving training to employees
7. Government support

## 10. Plant physiology

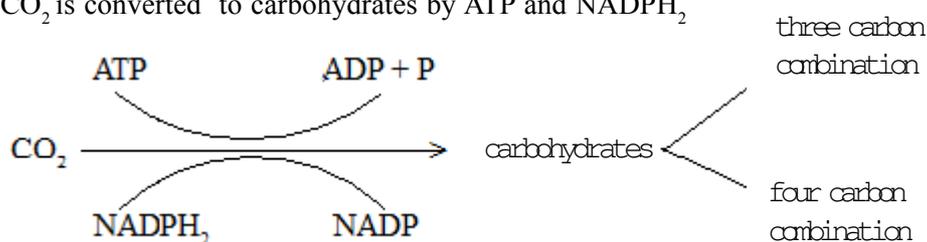
### 1. Describe photosynthesis

#### 1. Light reaction

- Occurs in Thylakoid of Chloroplast
- Light energy is deposited as chemical energy in ATP and NADPH<sub>2</sub>
  - $\text{ADP} + \text{Phosphate} \rightarrow \text{ATP}$
  - $\text{NADP} + 2\text{H} \rightarrow \text{NADPH}_2$
- Products of light reactions are  $\text{ATP}$ , NADPH<sub>2</sub>, O<sub>2</sub>

#### 2. Dark reaction

- Occurs in stroma of chloroplast
- There is a series of enzymatic reactions
- CO<sub>2</sub> is converted to carbohydrates by ATP and NADPH<sub>2</sub>



### 2. Define respiration

#### Steps

- Glycolysis
- Krebs cycle
- Electron transportation

#### Glycolysis /break down of Glucose

- occurs in cell plasma
- Breaking down of a Glucose molecule to two molecules of carbon three Pyruvate molecules.
- Produce two molecules each from ATP and NADPH<sub>2</sub>

#### Krebs cycle

- Further Metabolism of Pyruvic acid
- Depends on whether it is possible to get O<sub>2</sub> to cells or not.
- In aerobic respiration cells receives O<sub>2</sub>
- Pyruvic acid produced in Glycolysis enters the Krebs cycle.

As a result following molecules are produced.

- ATP - 1 Molecule
- NADPH<sub>2</sub> - 4 molecules
- FA D H<sub>2</sub> - 1 molecules

Electron transportation

- NADPH<sub>2</sub> and FADH<sub>2</sub> travel along Cytokrome pigmentation system and oxidize
- Energy is produced there
  - 3 ATP molecules are produced from one molecule of NADH<sub>2</sub>
  - 2 ATP molecules are produced from one molecule of FADH<sub>2</sub>
  - H<sub>2</sub>O is produced as a by-product

3. Defining respiration

Describing affecting factors

- Internal factors
  - Enzymes
  - Cell compounds
- External factors
  - Temperature
  - O<sub>2</sub> concentration

4. Defining photosynthesis

Light

- Photosynthesis occurs at a high rate when high light intensities are available.
- At high light intensities stomata get closed otherwise chlorophyll get damaged and photosynthesis will be controlled.
- In order to get a higher yield, the arrangements have to be made to provide sunlight to the crop. Planting at correct spacing, Pruning, hanging weights branches get to space for the branches to increase the yield.

Temperature

- Photosynthesis occurs optimally at temperatures between 35<sup>0</sup>C - 40<sup>0</sup>C .
- Poly tunnels, green houses can be used in areas like Nuwaraeliya where the temperature is low to provide optimum temperature and increase the yield.

CO<sub>2</sub> concentration

- Increase CO<sub>2</sub> in the green houses

Water

- Preventing water shortages to crops
- Make arrangements to conserve water

Inhibitors and pollutants

When stomata can get blocked due to fallen of Chemical wastes such as dust and carbon particles on the leaves, the yield can be increased by washing them.

5. Define photosynthesis

1. Photosynthetic pigments

- Light is absorbed by photosynthetic pigments  
Chlorophyll a  
Chlorophyll b  
Carotene  
Santhophyll
- Chlorophyll a and b directly contribute to photosynthesis
- Amount of chlorophyll affects on amount of photosynthetic products and photo synthetic efficiency

2. Water content in mesophyll cells

- Closing of stomata can be prevented by maintaining water content in mesophyll cells at an optimal level.

6. Define photosynthesis

1. Chlorophyll a and chlorophyll b pigments directly affect photosynthesis. Destruction of these (Chlorosis) occurs as a result of viral diseases or nutrient deficiencies. Therefore photosynthetic efficiency can be increased by preventing such conditions.
2. Closing of stomata can be prevented when the water content of mesophyll cells are at optimal level. Having proper irrigation, proper maintenance of humidity levels around the crop will enable this situation.

7. Define transpiration

Three methods

1. Stomatal transpiration

losing water in form of water vapour through the stomata in the plant leaves is known as stomatal transpiration. 98% of water is lost by transpiration. The moisture concentration inside the leaf is greater than the water vapour surrounding the leaf Then environment water vapor is emitted to the atmosphere relative to the potential gradient.

2. Epidermal transpiration

Evaporation and emission of water in epidermal cells of leaves and tender stems through the cutin is called epidermal transpiration.

3. Lenticel transpiration

Lightly packed cells in the bark of a woody tree stem are named lenticels and the evaporation of water through these lenticels is called lenticel transpiration. This occurs at minute levels.

8. Defining photosynthetic efficiency

- Bending of leaves towards the light photoperiodism  
This allows absorbing of a greater quantity of light and its efficient
- Transparent epidermis
- Flat, thin leaves
- A greater number of stomata
- Opening of stomata as response to light
- Fistular system spread throughout the leaf.

9. Defining photosynthesis

The field management practices that can be applied

1. Prevent the wastage of the space in the field  
Planting the maximum number of plants per unit area maintaining its recommended spacing
2. Prevent mutual shading
3. Multi layer crop cultivation  
Grow dark loving crops among light loving plants
4. Train creepers at places where they can find space
5. Make arrangements to keep the field covered with crops
6. Removal of competitive weeds
7. Removal of the inefficient plant parts in photosynthesis.  
Dried leaves, diseased leaves and leaves under shade and photosynthetic efficient leaves

10. Defining plant growth regulators

Uses in the agriculture

- To induce rooting of stem cuttings
- To increase yield
- To enlarge fruits
- To induce flowering
- As a weedicide
- To extend to the post harvest storage period
- To keep the number of flowers and fruits in the optimal level
- To get the seedless fruits (Parthenocarpy)

11. The crop yield can be increased by regulating the plant respiration rate. Control the speed of generating energy by breaking down of organic compounds which is known as controlling respiration rate.
1. To induce the seed germination  
Eg: Heap and cover soaked paddy seeds and keep the weights on it. Mulching of the nursery beds
  2. Rooting of stem cuttings  
Rooting of planting material is induced by increasing temperature which leads to increase in respiration rate.  
Eg: Usage of lant propagation structures
  3. Protect the viability of seeds in the stores  
Combustion of the storage food and the germination of seeds can be reduced by reducing respiration rates of the seeds.  
Eg: Applying white colour on the walls of the stores, Air conditioning of stores, filling gases such as Hydrogen and Nitrogen
  4. Reduce food usage in plants  
Respiration takes place combusting foods although the photosynthesis does not occur that much when a sufficient amount of solar radiation does not fall on leaves. Therefore, respiration surface can be reduced by pruning branches in shade.

13. Describe the radial transportation

Three types

1. Apoplast route  
The movement by diffusion through the cell walls and the inter-cellular spaces and the movement by mass flow.
2. Symplast route  
The movement of water by diffusion through cell plasma across plasmic bonds.
3. Vacuolar route  
The movement of water from cell to cell and vacuole to vacuole through the cell walls, plasmatic membranes and vacuole membrane.

## 11. Pests

1. Defining the term weed

Advantages

- Prevent soil erosion
- Act as a mulch to protect soil moisture
- Add organic materials to the soil
- Feeds farm animals
- Use as medicinal herbs
- Control pests
- Fix nitrogen in the soil
- Use as an ornamental materials in land scaping
- Provision fo genetic material in breeding programmes.

2 Defining the term weed

Adverse effects

- Decrease crop growth due to the competition for sunlight, space and nutrients
- Reduces the quantity of the yield
- Limits the number of crops that can be grown
- High expenditure to control pests and weeds
- Reduces land value
- Reduces the ef fectiveness of the farmer .
- Blockage of irrigation channels
- Certain weed are toxic to farm animals

3. Defining the term weed

Adaptations

- Ability to overcome unfavourable conditions
- Produce large number of seeds
- Certain weeds have short life cycles and propagate rapidly; .
- Certain weeds propagate by both sexual an asexual propogation methods.
- . Certain weeds show a rapid growth rate.
- Seeds are adusted to exist under unfavourable enviornmental conditions.
- . Have efficient seed dispersion method.

4. Defining the term weed

mechanical methods.

- Pulling out by hand or digging by using tools.
- Remove the aerial parts of plants
- In land preparation and manmoting
- Burning
- Mulching
- Covering the ground completely with water .
- Exposing the soil to solar radiation.

agronomic methods

- Use of clean planting materials
- Proper application of fertilizer
- Crop rotation
- Mixed cropping
- Inter – cropping
- Maintain intervals between two seasons
- Usage of cover crops

5. Defining the term pest

Agronomic practices

- Proper land preparation
- Cultivate timely
- Simultaneous cultivation (Yaya approach)
- Application of recommended fertilizer in accurate amounts / quantities
- Proper water management
- Crop sanitation
- Crop rotation
- Mixed cropping
- Maintaining the recommended spacing between plants
- Cultivate resistance varieties
- Cultivate trap crops
- Cultivate repellent crops

6. Defining the term plant diseases

Modes of distribution of plant diseases

1. Soil born diseases
  - Damping off
  - root knots in tea
  - Bacterial wilt
2. Diseases borne by air
  - Bacterial blight
  - Coffee rust
3. Seed borne diseases
  - Late blight in potato
  - virus diseases
  - soft mottle virus disease in papaw
4. Disease transmitted by vectors
  - Leaf curl complex
  - Leaf mosaic virus
5. Diseases transmitted by agricultural equipments
  - by grafting knives, secateurs, pruning knives

7. Defining what a pesticide

**Advantages**

- Pests can be controlled within a short time in a particular area.
- Pesticides can be purchased and used according to the nature of damage.
- Pests living in plants internally, can be controlled
- Minimum labour cost can be used to control.

**Disadvantages**

- Breaks the environmental equilibrium.
- Destroy environmental friendly living organisms
- Chemical pesticides can enter the human body which may cause cancers
- Damages bio diversity
- Resistant pests may develop.
- Pollute water bodies

8. Defining the term pesticide

Information which should be available

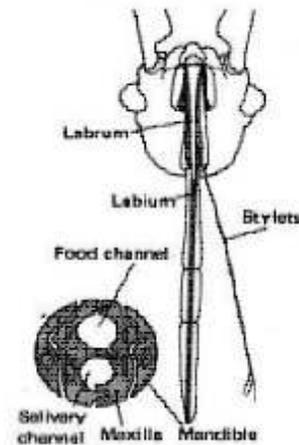
- Trade name of the pesticide
- Common name under the trade name
- Mentioning as a poison
- The amount of active ingredients, nature and the volume
- Price, date of manufacture and the active period
- Instructions for usage
- Recommended safety measures
- Recommended first aids for intoxication
- Display the colour strip relevant to the toxic level
- The above information should be stated clearly in all three languages (Sinhala, Tamil, English)

9. Defining the term pesticide

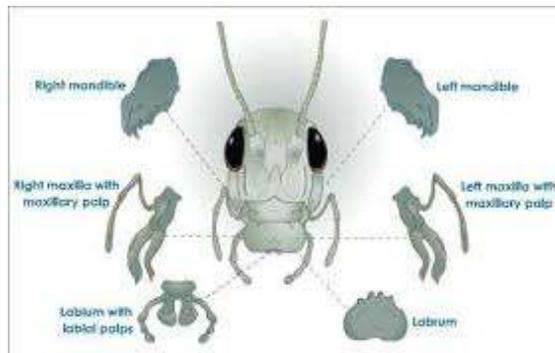
- Read and strictly follow the instruction given
- Select the correct equipment and ensure its fitness for the purpose.
- Use appropriate measuring equipment to prepare the required concentration
- Use safety clothes during application
- Get the assistance of someone to apply highly toxic pesticides.
- Use the direction perpendicular to the wind.
- Avoid taking food, drinks, chewing betel or smoking immediately after handling pesticides.

10. Defining insect pests

1. piercing and sucking type of mouth parts  
There is a modified rostrum for piercing and sucking of juice in the abdomen side of the head.
  - Inferior rostrum has modified and there are of stylet inside rostrum.
  - Inferior rostrum has modified and there is a pair of stylet inside rostrum.
  - Pierce tissues by stylet. There are two fine tubes in side the stylet.Sucking juice from tissues by one tube.

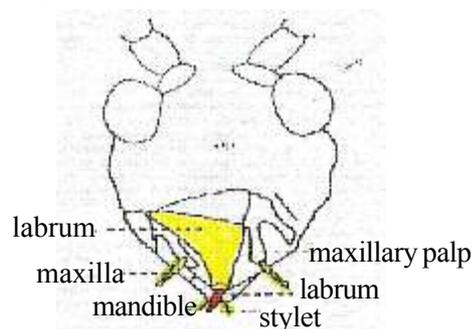


2. biting chewing mouth parts.



- Their mandibulars are clearly visible for biting & chewing of plant parts.  
eg. Orthoptera, Isoptera, Coleoptera

3. Rasping a Sucking Mouth parts.



- Pest's rostrum is very short & it is cone shape.
- There is very short stylet.  
eg: Plant, Thrips

## 12. Post harvest Technology

1. Defining post harvest

Seeds preparation method

- Harvesting at maturity using correct method
- Harvest without damaging seeds
- Clean seeds properly
- Dry seeds properly
- Pack in clean gunny bags

How to prepare for storage

- Clean the building
- Cover damaged parts of the floor
- Apply white coloured paint outside
- Repair the roof
- Close vents with wire mesh
- Adopt methods to dispel insects
- Keep the seed bags on the wooden frames

2.

Raw rice	Par boiled rice
<ul style="list-style-type: none"><li>• When pounding rice husk and bran get removed</li><li>• Susceptible to pest attacks easily</li><li>• Susceptible to pest attacks easily</li><li>• Cannot store</li><li>• Less nutritious because the nutrients are removed as bran</li><li>• No addition of toxic materials</li></ul>	<ul style="list-style-type: none"><li>• Rice husk only gets removed</li><li>• Get gelatinized when boiling and get strong due to drying</li><li>• Tolerant to pest attacks</li><li>• Can store</li><li>• More nutritious</li><li>• As a result of a long soaking period there is a bad odour and toxics get collected</li></ul>

3. Defining post-harvest technology

Importance

- Protect the yield and use in the off season Eg: Jack, Bread fruit
- Control market price/ control price fluctuation
- Preserving perishable crop yield
- Diversification of yields
- Make convenient transportation Preparing harvest for transportation to the far areas and the foreign markets
- Storing as genetic resources/planting materials
- Protect quality of yield
- Minimize wastage

4. Yield can be categorized based on its nature

1. The yield that can be stored
2. The yield that cannot be stored

**the yield that can be stored**

- Can store after processing
- Less moisture in the yield
- Less quantity of the yield
- Outer layer is thick and gives protection to the interior Eg: Green gram and Cowpea
- Can store in one place for a long time
- Yield losses due to external factors Eg: moisture, animals

**Yields that cannot be stored**

- Can store only for a short period after harvesting and processing
- High moisture content in the yield. eg: Fruits, Vegetables
- Quantity and weight of the yield is high
- Outer cover is soft. Ability to protect the interior is less
- Can be stored only for a few days or a few weeks
- Losses at storage
  - Internal - by vectors in transportation
  - External - losses, spoilage

5. Yield that is harvested only after reaching its maturity is known as “Non-climetric” group.

Special characteristics of this yield are,

- Respiration rate of this yield continuously decreases from harvesting stage
- Ethylene is produced at minimal levels
- Ethylene production of fruits cannot increase by supplying it externally
- After harvesting fruits do not ripen Eg: Grapes, Strawberry, Cherry
- Therefore, this kind of yield has to be harvested when it reaches the maximum maturity level.

6. Define post harvest losses

Affecting factors

1. Internal factors
  - Losses due to physiological activities
    - Respiration, Wilting due to functions such as respiration, shrinkage
2. External factors
  - Exposure to unfavorable climatic conditions
    - Temperature, Rainfall, Wind
  - Insect damage
  - Diseases
  - Rough handling
3. Pre-harvest factors
  - Not applying water and fertilizer properly
  - Deficiencies
  - Damage due to animals

7. Defining post harvest losses

Factors affecting post harvest losses	Minimizing
<ul style="list-style-type: none"><li>● Harvesting before maturity</li><li>● Manual harvesting</li><li>● Harvesting without leaving sufficient length for the stalk</li><li>● Climatic factors on the day of harvesting is not considered</li></ul>	<ul style="list-style-type: none"><li>● Harvesting at the correct maturity level according to the indices</li><li>● Use of equipment to harvest eg: such as scissors</li><li>● Harvesting keeping sufficient length for the stalk</li><li>● Avoid harvesting on rainy, sunny days</li></ul>

8.
  - Usage of proper packing materials eg: Plastic boxes ( To avoid tump)
  - Putting only a suitable quantity in packing
  - Not pressing too much
  - Usage of clean packages
  - In order to avoid touching each other packing in separate packs
  - Avoid transporting ripened fruits along with raw fruits
  - Careful loading and unloading
  - Transport in vehicles with freezers
  - Transport only a bearable quantity in the vehicles ( Mechanical damages can occur due to increase in temperature)
  - Not sitting and not sleeping on the yield

9. Objectives of par boiling of paddy

- More rice is received
- Protect nutrients
- Preventing further damages to the seeds
- Easy to remove husk
- Small percentage of broken grains
- Little pest damage
- Little possibility to overcooked conditions
- Storage period is lengthy

Steps

1. Soaking

- Grains become softer  
Soaking period varies according to the temperature of water and rice variety  
Eg: Cool water - long grains - 48 hours  
Short grains - 36 - 48 hours

2. Boling with steam

Gelatinization of starch granules. Therefore breaking of the grain is prevented.

3. Drying

Removal of water

10. Defining packaging

Characteristics of packaging

- Non toxic and suitable for the relevant item
- Does not react with the food
- Sanitation is ensured
- Attractive
- Resistant to moisture and fat
- Resistant to collision
- Restricts emitting air and odour
- Easy to open
- Low cost
- Ability to print

11. Introducing pre harvest losses

Factors to be considered

- Targeted Market - Local/ foreign
- If foreign market is targeted and if the standard is not in accordance with recommended level, yield losses can be occurred
- Using quality planting materials
- cultivating recommended varieties  
Eg: 'Karthakolomban' is suitable for the dry zone
- Suitability of the land for cultivations
  - Soil
  - Land preparation  
If the land is not prepared correctly branched roots occur and demand for that is less
- Pest control
- Crop sanitation
- Proper fertilizer application
- Thinning of yield
- Crop establishment with correct spacing and pruning at the correct time

## 13. Home gardening and paddy cultivation

1. Defining the term home garden
  - Identify the agricultural potentials in a garden – should have information on soil, water, sunlight and space of a home garden
  - Identify the agro products which are going to be established in the home garden.  
Eg. crops and animal husbandry
  - Identify the problems uncounred in the production of above agro products.  
Eg: Problems in soil conditions, soil erosion, less harvest
  - Identify the technological alternatives and inputs to solve the problems.
  - Identify the recycling of waste
  - Preparation of propagating materials
  
2. Defining the term home garden
  - Family food requirements can be met
  - Receiving a continuous income throughout the year
  - Maximum usage out of the inputs
  - Protecting the bio diversity
  - Utilizing the maximum benefit out of natural resources.
  - High production with simple and minimal technological inputs.
  - Utilizing the family labor and leisure time in the productive manner .
  - Generating mental and physical satisfaction through comfortable environment.
  - Having opportunity to share agricultural knowledge with neighbours.
  
3. Define the term home garden  
Environmental friendly pest control methods.
  - Selection of crops suitable for the area and the season
  - Planting healthy and viable seeds or plants.
  - Strengthen the plant by using organic manure
  - Removal of pests by introducing constant farmer friendly – dragon fly
  - Use repellent crops and trapping crops – minchy, sera, patta
  - Maintaining crop sanitation
  - use alternatives for pesticides – organic pesticides
  - Covering fruits
  - using physycal methods

4. Defining soil conservation

The soil conservation strategies

- Establishing cover crops
- Establish mechanical methods such as earth bunds and stone bunds as well as biological methods.
- Collecting organic fertilizers oftenly
- Covering the soil with coconut husk
- Following the methods of zero land preparation and minimum land preparation.
- Continuous and complete land usage
- Using mulching materials

5. Defining home garden

- Having high bio diversity
- All the garden accessories act as an integrated system
- Getting high production through simple and minimum technical inputs.
- Helping to organize family labour, time, social and economic activities without intersecting with each other.
- Local crop varieties can be established within an environment where the factors of production are limited.
- Activating natural pest control through environmental method and bio diversity

6. Defining home garden

**Soil management**

- **Soil conservation**
  - Establishment of cover crops, stone bunds and earth bunds.
- **Nourishing the soil**
  - Soil fertility is increased by applying organic fertilizer which develops its physical, chemical and biological characters.
  - Adaptation done in the problematic lands. Eg: Lands with salinity and poor drainage.

**Water management**

- When there's a low water supply, plants can die and frequent water supply may cause problems in hardening a plant
- When supplying water in the morning or evening the retention is high as the evaporation is low.
- Proper weed management helps the crops to obtain more water.
- Recycling the waste water removed from the kitchen and washrooms can be applied to crops.
- Mulching minimizes evaporation and helps weed control.
- Water absorption capacity is increased by applying organic matter.

**Management of sunlight / solar energy**

- Following the possible methods in cropping patterns and cultivation patterns in order to maximize usage of sunlight.
- Shade management by maintaining the recommended spacing in different crop varieties
- Establishing the crop in order to receive sun light from the east.

7. Define seeds

**Step**

- Select high quality seed paddy certified by the department of agriculture to start the cultivation.
- Start the seed paddy cultivation in order to synchronize harvesting the yield during a dry period.
- Selection of a paddy field with a good water supply and without shade.
- Practices should be conducted in order not to mix it with other varieties.
- Good land preparation - in order to destroy the residues of the previous paddy cultivation.
- Conduct high agronomic management practices – recommended spacing, plant in rows, usage of recommended fertilizer
- When the cultivation is 14 – 21 days remove weeds in the field and earth burls.
- Removal of other mixed varieties and plants in the initial stage as well as after the panicle initiation stage
- Harvesting after the 85% of the paddy cultivation has turned golden in colour and dry it for 1 – 2 days in the harvest field itself.
- Thresh it on spread made out of gunny bags or by using a thresher
- Dry and fan the harvest and remove inert matter using a seive.
- Storing in clean gunny bags after drying paddy, maintaining the moisture content between 12 – 13 %,

8. 1. **Vegetative stage**

- The period begins with seed germination and ends with panicle initiation.
- Seed germination, leaf and root initiation occurs at the seedling stage.
- Tillering starts 10 days after establishing the cultivation in the field (Tillering pattern should be explained)

2. **Reproductive stage**

- The period in between the floral primodium initiation stage to the embryonic stage.
- This reproductive stage is divided into 3 stages.
  - forming a floral primodium
  - Booting
  - Heading and flowering stage

3. **Mature stage**

- From embryo to mature stage
- Takes 30 days and there are several growth stages are formed.
  - Milking stage
  - Solidifying stage
  - Seed maturity stage

9. Defining what nursery is

### **Type of Nurseries and advantages**

#### **1. upland nursery - Advantages**

- Healthy and vigorous plants can be obtained as they are kept for a long period in the nursery and the usage of basal dressing.
- Advance technological knowledge is not needed.
- The required seed paddy is comparatively low.
- Extra time is saved to do the field work
- a low cost method
- Maintenance is easy

#### **2. Lowland nursery - Advantages**

- Required water quantity is little to prepare the beds
- Any place with water facility available in the field can be used to establish the nursery.
- Drought resistance plants can be obtained.

#### **3. Dapog Nursery - Advantages**

- No need of controlling weeds
- The nursery can be maintained even in a building, therefore damages due to bad weather conditions can be avoided.
- No need to supply fertilizer

#### **4. Plate nursery - Advantages**

- One plate can be used for a few seasons.
- Parachute method can be used in broadcasting plants.

10. Define establishment of crop

Method of Establishment of rice

#### **1. Seed broadcasting / direct seeding**

Slightly germinated seeds in sprouts are hand sown without keeping any spacing .

#### **2. Row seeding**

Can be establish by hand or slender .

#### **3. Transplanting**

There are two methods.

- Broadcasting of plants.  
No recommended or fixed spacing in establishing plants.
- Row transplanting  
There are intended spacing in intra and inter plants.

#### **4. Broadcasting of plants.**

Broadcasting of seedlings which are grown from platelet

11. Defining Dapog Nursery

Making a dapog Nursery

- 1 m length, 5 – 7 cm in height and 30 cm in width beds are suitable.
- spread banana leaves / polythene and cover the edges with banana mid ribs or bricks.
- A layer of paddy husk or compost is spread over the banana leaves or polythene
- Slightly sprouted 3 – 4 seeds height are spread on it
- press it with a piece of wood

## 14. Animal Science

1.
  - Cultural and religious influences  
Eg: Buddhists are reluctant to engage in animal husbandry as a form of employment
  - High input prices  
Eg: Poultry feed are expensive
  - Difficulties in getting animal breeds that give quality products
  - Deficiencies in the veterinary services
  - Weaknesses in the agriculture extension services
  - Importation of the animal products from other countries
  - Scarcity of the animal feed Eg: Types of Grasses

2. Defining milk

To get high quality milk production

- Cleanliness of milking parlor
- Cleanliness of the cow
- Cleanliness of the milker
- Following strip cup test
- Milking mastitis affected cows separately

To get high quantity of milk production

- Complete milking within 5-8 minutes
- Reduce the time period of milking
- Milking should be done by person, familiar to the cow
- Not creating restless conditions

3. Defining an animal house

characteristics

1. Should not be prone to floods
2. A place without strong winds
3. Availability of transport facilities
4. Secure place from burglars
5. Close to the market
6. Close to the manager's house



**Internal characteristics**

Internal characteristics are tested using Candling equipment

- It should be transparent when it is directed to a beam of light if the egg it is suitable for hatching.
- Eggs with cracks on the shell, blood patches and meat pieces are not suitable.
- If there are two egg yolks in the egg it should be removed.
- If the air sack is large, egg is not suitable.

7. Defining culling

stages of culling

- In egg stage
- At day old stage
- At the removal from the brooder
- At the Growing stage
- At the beginning of egg production
- At laying egg stage

In above each stage culling features should be stated

8. Define quality egg

procedures

- Collection of eggs a few times a day
- Preparing egg boxes
- Keep the litter clean and dry
- Clean the egg boxes a few times a day
- Clean eggs or dirt
- Avoid damaging eggs  
Eg: prevent pecking to eggs
- Feed properly

9. Defining farm animal diseases

procedures to be adopted to minimize infection

- Rearing breeds suitable for the climatic zones
- Provide animal shelters
- Maintaining cleanliness in farm equipment and farm animals
- Provide balanced food rations
- Follow appropriate immunization procedures
- Separate the diseased animals from the healthy animals
- Follow biological protection methods
- Ejectment of animals

10. Describe the importance of sanitary management of farm animals

Defining sanitary management of farm animals

Importance

- Decrease the number of animal deaths due to the disease infections
- Keep the animal products at a higher level
- Maintaining the high quality of the animal products
- Little expenditure on treatment
- Prevention of disease transferring from the animals to human beings
- Utilize land, labour and capital efficiently
- Maximizing the profits

11. Defining broiler chicken

Steps

1. Stop provision of animal feed  
Stop feeding 8-24 hours before slaughtering - provide reasons for this)
2. Catching animals - Catch chicken by the legs
3. Transporting live animals
  - Animal should be transported without disturbing and causing any injury
  - Night time or morning is appropriate for transportation
4. Pre-killing test - Animals should be tested by a veterinary doctor before killing them.
5. Making chicken unconscious and cutting the neck
6. Removal of feathers
7. Removal of intestines
8. Washing
9. Post mortem
10. Freezing under 7°C
11. Packing
12. Storing

12. Defining artificial insemination

Procedure

1. Collecting sperm - Mostly artificial vagina is used for this
2. Evaluate sperm  
Microscopic tests or visual tests can be used for this  
Visual tests - colour of sperms, thickness, volume, pH value  
Microscopic test - movement of sperms, sperm concentration in a unit volume  
Unusual sperm percentage, live sperm percentage
3. Diluting sperms  
Egg yolk and Sodium nitrate medium, Egg yolk and phosphate medium, Milk is mostly used for this. These substances provide the required nutrients to the sperm
4. Cooling and storing of sperm
  - If sperms are not used immediately after dilution, it should be stored.
  - If there are stored for a long term, they should be frozen.
5. Transportation of sperms
6. Insemination of cows  
Anal- vaginal method is used for this.

## 15. Food and Nutrition

### 1. Defining food spoilage

There are two main factors affecting on food spoilage by micro organisms.

1. Extrinsic factors
2. Intrinsic factors

#### **Extrinsic factors**

1. Temperature – At low temperature as the activities of micro organisms is low, therefore the food spoilage is slow.  
The growth and activities of microorganism increase in certain high temperature range.
2. Relative Humidity – When the moist humidity increases, the spoilage of food also increases.  
The reason for that is absorption of water in to the food enhances the microbial action.  
Ex: Fungi
3. Air – Requires for the activities of aerobic bacteria.

#### **Intrinsic Factors**

1. pH value – The activities of most bacteria becomes weak in low pH level and but the food spoilage occurs due to the activation of fungi.  
Ex. yeast
2. Moisture content – When the moist content content in food increases, growth of micro organisms also increases.  
Specially food spoilage occurs when fungal infection increases.
3. Potential of oxidization & Reduction –  
When oxidization and reduction potential is high, food spoilage increases.  
\* The potential of oxidization & reduction is low in new food.
4. Nutrient Components – Nutrient components in food directly contribute to the function of micro organisms.  
Ex. The foods which contained high protein, are spoil quickly.

### 2. Defining food spoilage

#### Adverse Effects

- Food borne infection
- Food poisoning
- Changes in physical properties of food
- Changes in chemical properties of food
- Reduction of Nutrition
- Reduction of assurance of food
- Reduction of hygienic of food

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- Food borne infection – is caused by the ingestion of food containing microorganisms and establish in the human intestinal tract.
  
- Food poisoning – is caused by ingesting food containing toxins which are secreted by micro organisms.  
Symptoms :  
Stomachache  
Vomiting  
Diarrhea  
Fever  
  
Ex: Clostridium botulinum  
Aspergillus flavus  
Cancer causing, changes in Liver tissues,  
sometime death can be occured.
  
- Changes in physical properties of food  
Deteriorate perceptible characters of food such as attraction, taste and smell.  
Therefore the food convert to non consumable condition.  
Ex. Stale rice – Change aroma, Sticky texture  
Sour milk – Fermentation of lactose acid
  
- Changes in chemical properties of food  
Due to the various chemical reactions of micro-organisms in food, the various chemical substances and toxins produces.  
Ex: Egg colour change into black or green colour .  
The reason for colour change is the production of  $H_2S$  gas by proteus spp.  
Change of colour into greenish colour of processed meat.  
Reason: The production of  $H_2S$  or  $H_2O_2$  gas by Lactobacillus.
  
- Reduction of Nutrition  
The changes of nutrient component in food due to the microorganisms activities, and it causes to damage the nutritional value of food.  
Sometimes the toxic substances are added to the food.
  - Therefore the security of food is low due to the deterioration of properties and the assurance of preservation of food.
  - Consumption of such foods looses health assurance due to various toxins and food borne infection.

3 Defining food Preservation

1. Pasteurisation

- Use the temperature below 100°C.
- Destroys all micro organisms & their spores.
- Therefore all pasteurized food products should be stored in less than 10°C temperature.

There are two types of methods.

1. High Temperature Short Term method (HTST)

Liquid foods are heated to maintain temperature at 71.7°C for 15 seconds. Later the temperature reduces upto 10°C quickly and the food is stored.

2. Low Temperature Long Term method (LTLT)

Keep up the temperature at 62.8°C for 30 minutes. Later reduces the temperature up to 10°C and store the food.

2. Sterilization

- Micro-organisms and spores which affected on food spoilage are destroyed.
- Foods are packed in clean bottles and the temperature is maintained in 120°C, under pressure of 6.5cm<sup>2</sup>, 6.8kg for 15 minutes.
- The containers must be sealed to avoid contaminating by micro-organisms just after sterilization.
- In this process unstable compound like vitamins are destroyed due to high temperature.
- Taste can change due to caramalization of sugar .

3. Blanching

- Blanching is a pre treatment of food preservation.
- This treatment is mostly used for vegetable & fruit drying.
- It controls changing the colour of food in to brownish colour after cutting into pieces.
- The reason for that is the enzyme responsible for changing colour to brown colour .
- The following mentioned methods can be used for blanching.
  1. Dipping in hot water – Temperature of 100°C water for few minutes.
  2. By vapour – Expose to the vapour of food in short period of time.
  3. Using micro waves – Keep microwave oven for short period of time (for 1 minute)

4. Osmosis Dehydration

- Reduce the diffusion of water in food by osmosis.
- Enzymic activities & micro organism activities in food are controlled by that.
- In this method the food are dip into concentrated liquid like salt, sugar, honey. Then the percentage of water in food becomes less as the driving force for the diffusion of water from the food in to the solution.

Ways of food availability.

- Preservation of temporary crops.
- Using of preserved food in the deficient period of food.
- Reducing wastage in high crop production has.
- Increasing attraction and easy to consume by diversification.
- Supplying foods to the manner of increasing the demand of some high demand crops further.

6. Defining Food Packing

**Importance**

- Ability to control entering and exiting of microorganism, water, air and light.
- Easy to transport and store.
- Protect food quality.
- Easy to gather as a unit.
- Increase consumer preference and demand.
- Increase quality of the product.
- Ability to create attraction in the competitive market.
- Ability to provide details of the product to the consumer.

7. • Passing milk in to the chamber under high pressure.
- Drops spread through the nozzle at the edge of the blade.
  - Evaporation of water from the droplets due to temperature.
  - The shape of milk powder particles is created according to the nozzle.
  - Lecithin is used to increase water solubility.
  - Factors like temperature, moisture level and quality of milk affect the quality of milk powder.

8. It happens in 2 ways.

1. Enzymic Browning Reaction.
2. Non Enzymic Browning Reaction.
  - Melard Reaction
  - Caramelization.

9 Defining Food spoilage.

There are 2 major microorganism groups.

**1. Bacteria**

- One celled organism.
- Their growth on food causes to change taste, aroma and appearance of food.
- Developing on protein enriched food makes bad smell and on the surface.
- Consuming food containing harmful bacteria may cause different infections.  
(Various infections can be caused by Consuming food containing harmful bacteria)
- *Salmonellatyphi*
- *Vibrio cholerae*
- Some harmful bacteria release toxins which make food poisoning. It may also cause death.  
ex:           greening of chicken.  
                  Blackening of eggs.

**2. Fungi**

- Yeast is uni – cellular others are multi cellular .
- These can develop even on acidic or dry food and can spoil food.
- Yeast acts on sugar contained food and turn them into sour taste.

10. Oil containing food and lipid can be easily turned into rancidification. It can be caused in 2 ways

1. Oxide Rancidification
2. Hydrolysis rancidification

**Oxide Rancidification**

- Rancidification caused by Oxygen
- It is mostly occurred in food containing unsaturated fat acids.
- This is a chain reaction. Lipids take Oxygen gas, creates initiative compound like peroxide or hydro peroxide and then turn in to compound like aldehyde and alcohol.
- It may cause bad taste and smell in food and reduce the storage duration.

**Hydrolysis Rancidification**

- Lipids turn into free fat acids and Glycerolein in hydrolysis rancidification.
- This action can be caused by heat , Lipase enzyme or microorganism.
- Fat acids and Glycerole created by the collapsed lipids in food, continue collapsing and creating acid, Alcohol and Aldehyde.
- It may cause bad taste and smell in food.
- This action hastens (speeds up) when there' s microorganism in food.

11. ● Fiber is mostly made of cellulose, Hemi cellulose Pectin or Lignin.
- There' s no digestion enzymes for human fiber digestion.
  - Fiber can be found in 2 forms.
    - W ater soluble fiber
    - Non water soluble fiber
  - W ater soluble fibers absorb water in the intestine and inflate and turn into a ball which helps to bind bile.
  - Absorption of cholesterol and its level in blood can be decreased due to the storage of cholesterol contained in bile secretion.
  - It controls the rectum passage cancers caused by sugar in water soluble fiber contained food and saturated fats contains food.
  - It increases the amount of secretion because the water soluble fiber absorb water in the intestine.
  - The quantity of calories to the body is decreased because fiber increase the quantity of food. So it can control density .
12. A Standard of food means a collection of qualities formed to protect the consumer in purchasing food.

**Importance**

- Protect the consumer .
- Validate the assurance of food.
- Validation of assurance to make a healthy society .
- Increase the Resource utility efficiency .
- Being able to export quality food products helps to increase foreign income.

## 16. Eco-friendly agriculture

1. Defining street crop cultivation system

Importance of using perennial crops

- Provision of required shade for the crops
- Control weeds using it as a crop cover
- Soil conservation by using the pruned branches and leaves as a mulch
- Soil fertilization as a result of nitrogen fixation in legumes
- Conserve bio-diversity
- Reduce soil erosion
- Environment balance as a result of proper activation of natural processes
- Importance of leaves as a manure and as animal feed
- Provide timber and fuel

2. Defining mono crop cultivation

Adverse effect to the environmental balance

- Decrease in bio-diversity
- Non-occurrence of natural pest control
- Disturbance to the balance of soil nutrients
- Occurrence of soil nutrient deficiencies
- Occurrence of pest epidemic conditions

Beneficial effects

- Releasing a large amount of moisture from a mono crop cultivation like rubber contributes to maintain water cycle.
- Prevention of soil erosion by a mono crop cultivation like rubber.

3. Ways of using agricultural wastes productively

- As an organic fertilizer - farm waste, raw leaves
- Biogas production - cow-dung, straw
- Production of curios - Coconut shells
- As an animal feed - pruned branches of trees, crop residues
- As soil mulches - Pruned branches
- As a growth medium instead of soil - coir dust, rice husks
- For compost - Crop residues

4. ● It is important to use a legume in each of the above methods
- Grains, tuber crops and cash crops can be used as other crops

Advantages

- Conserve soil fertility
- Utilizing fertilizer in layers at different depths
- Weed control
- Minimize plant diseases and pest damages
- To get maximum productivity from the land
- Maximum use of labours

5. Definition of interim crop cultivation

Definition of mixed crop cultivation

Differences

Interim crop cultivation	Mixed crop cultivation
<ul style="list-style-type: none"><li>• Main crop exists</li><li>• Specified spacing</li><li>• No competition among crops</li><li>• Age difference among crops</li></ul> <p>Eg: Main crop – Coconut Interim crop – Pepper, coffee, pineapple, Banana</p>	<ul style="list-style-type: none"><li>• No main crop</li><li>• No specified spacing</li><li>• Competition among crops</li><li>• No age difference among the crops</li></ul> <p>Eg: Chena cultivation</p>

6. Defining Chena cultivation

- Soil erosion, increase in atmospheric temperature and increase in CO<sub>2</sub> concentration as a result of deforestation
- Increase in atmospheric temperature, destruction of organic matter, destroying soil fauna, releasing CO<sub>2</sub> to the environment due to setting fire.
- Destroying more lands due to changing land.
- Drying out springs
- Destroying bio-diversity

7. Defining mixed cropping

- Matching with the climatic conditions of the area  
Eg: Cultivating drought resistant crops in dry zone - ground nuts, gin
- Acquired aerial space  
Higher yield per unit area can be got from this
- Be alert to crop damaging pests and diseases
- Height of the plants - It is important when harvesting
- Interaction between crops - Pest control,
- Nutrient balance
- Establishing crops so that soil is conserved

8. Defining agro-forestry

- Simple eco-systems instead of natural forests
- Minimize soil erosion
- Addition of recycled organic matter to the field (nutrient translocation)
- Decomposition of organic matter ( Natural processes are occurred appropriately)
- Bio-diversity conservation
- Gene resource conservation
- Ground water conservation
- Protect atmospheric balance
- Receives animal feed and shelter
- Control environmental temperature

9. Defining Kandyan home gardening

environmental benefits

- Exists on slopy lands in the mid country and intermediate zones
- High diversity of flora
- Ability to get nutritious, balance food/ family nutrition
- Decrease in soil erosion
- Income throughout the year
- Fire wood, timber, food
- Protect genetic resources
- Shelter for animals
- Manure

10. Defining crop rotation

- Avoid stabilization of pest population
- Weeds are controlled by growing ground cover crops for one season
- Food chains of pests are destroyed
- As a result of nutrient translocation plants can absorb nutrients from different layers of soil avoiding nutrient deficiencies.
- Different pests attack different crops

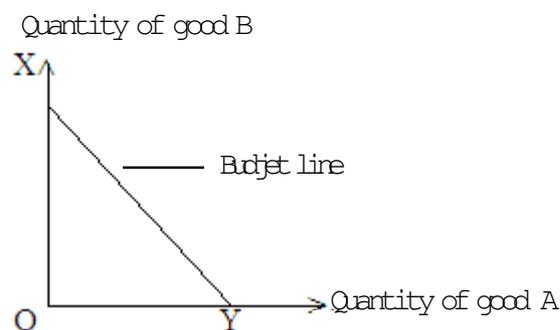
## 17. Agri Economics

1. The income of the consumer is considered as 'I' and the two goods as A and B.

$$\text{Price of the good A} = P_A$$

$$\text{Price of the good B} = P_B$$

If the consumer spends the entire income on consumer goods A B, the Budget line explains the level of goods mixing consumer can get



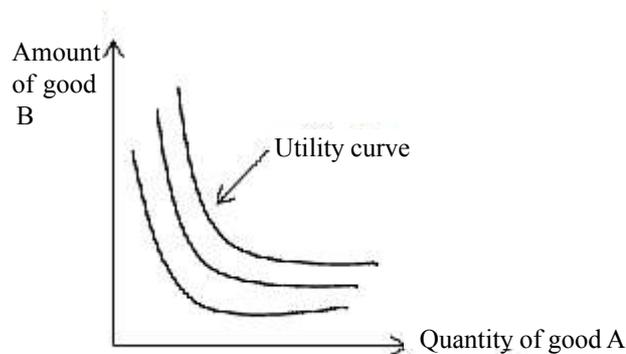
OX = If the consumer spends the entire income 'I' to buy the good only B, The quantity of good 'B' he/she can purchase.

$$\text{Then } OX = \frac{1}{P_B}$$

$$\text{Similarly } OY = \frac{I}{P_A}$$

However, he/she should maximize his /her utility by consuming both goods A and B, subject to his/her income level.

There fore when he/she spends the entire income to purchase both goods A and B, then the good combination as shown by XY can be purchased..

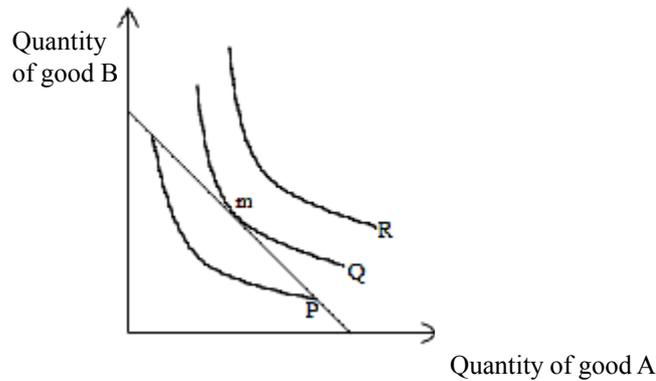


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A utility curve explains the same levels of utility a consumer gets by consuming different quantities of goods.

By using the utility curve and the budget line, the consumer will reach the maximum utility level as shown in the graph below.



The maximum utility is reached at point 'm' when the income is 'I' then, he/she consumes quantity of good A and X quantity of good B.

### 2. Defining the business plan.

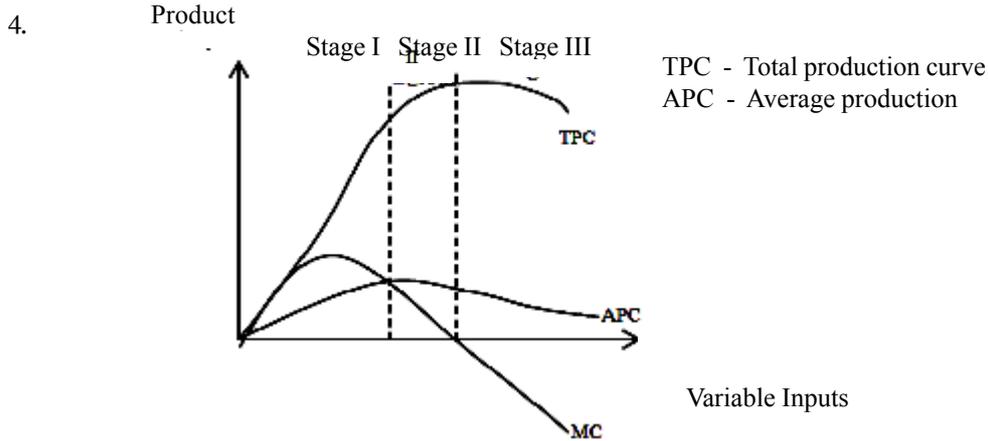
The importance of a business plan

- To organize the business systematically.
- To motivate achievement of the vision and mission.
- To help obtain bank loan and other investment.
- To recruit the most appropriate staff
- To get an idea whether the business has earned a profit or a incurred loss.
- To obtain necessary information to expand the business.
- To take correct discussions.

### 3. Defining a farm

Importance

- To find out cost, income, profit or loss in different production processes of the farm.
- To analyse the cost and increase the efficiency of inputs used.
- To know the inputs needed with time. Eg: The labour, equipment, fertilizer, etc. needed for the farm.
- To estimate the physical and financial resources of the farm.
- To pay the income tax of the farm.
- To minimize risk associated with this business.
- To manage the farm efficiently over a long period of time.
- To identify the weakness in the farm.



There are 03 main stages.

1. First production stage

- The distance from the zero production to the point above marginal production (MP) is equal to the average production (AP).
- In this zone, the production increases at an increasing rate initially and increases at a decreasing rate thereafter.
- The production can be increased by adding further inputs within this stage.
- Therefore, the producer does not stop the production process in this zone.

2. Second production stage

- This stage starts at the point when the average production is equal to marginal production, and goes up to the point when the total production becomes maximum.
- Within this stage, when the total production is maximized, the marginal production becomes zero.
- Although average production and the marginal production are reducing, they get positive values.
- In this stage, output reaches the maximum, while variable inputs match with fixed inputs.

3. Third production stage

- Total production is decreasing and the marginal production has a negative value.
- Since the total production is reducing over unit of variable inputs, it is not advisable for the manufacture to enter this stage.

5. Define labour

methods

1. Take steps to increase the quality of labour since the quality of labour affects the efficiency of other factors of production.
2. Focusing on more labour intensive production process
3. Managing skilled labour properly
4. Division of labour
5. Utilizing the labour for the production process considering the factors affecting the efficiency of labour obtained and standard of living

6. Defining demand

Factors affecting demand

- Considering the product's price – when the price of the product is decreased demand of the same product is increased
- Price of substitutes and complementary goods when the price of the substitute is decreased the demand for that product is increased. The demand for that product is increased when the price of complementary goods is decreased the price of the particular good is also decreased and the demand for it increases
- Income of the consumer  
when the income is increased, demand for a particular good increases.
- Government policies
- Promotion
- Social and cultural impact
- Environmental factors.

7. Problems

- Presence of a large number of intermediaries
- Majority are small scale producers
- Debt bondage
- Difficulties in applying new technology
- Improper processing and packaging
- Weakness in standardization and classification
- Inadequate storage facilities
- Market distortions
- Incompleteness of market information
- Lack of development in infrastructure.

8. Define the price elasticity of demand of a product .

factors

- Availability of substitute goods if a good has a very similar substitute good, such a good has an elastic demand.
- Nature of the good ( whether essential or luxury )
  - There is an inelastic demand for essential goods and luxury goods, they have an elastic demand and the value of the demand elasticity is greater than one.
  - Luxury goods have an elastic demand and the value of the demand elasticity is greater than one.
- Usage of a quantity of a good.  
When there are different usages of a given good, they have an inelastic demand.

- Percentage of expenditure of the total income for a good.  
When a consumer spends a large percentage of his /her income to buy a particular good when the price is increased, the good is consumed in smaller quantity .Therefore, the good has an elastic demand.
- Time.  
Short term demands are comparatively inelastic.
- Shelf life of a good.  
If the shelf life is long, There is an elastic demand for such goods.

9. Define the term production cost.

Types of costs.

1. Variable cost  
The cost that changes relative to the quantity of production and in the short run, cost that are subject to be charged.
2. Average cost  
The total cost to be incurred in producing one unit.
3. Marginal cost  
The additional cost added to the total cost when producing an additional unit of a product.
4. Total cost  
Total of variable cost and fixed cost increased in the production of a batch of product is known as total cost.

- 10.
- High government involvement
  - Statistic nature of the market
  - Too lengthy supply process/ Chain
  - High wastage
  - Only primary goods, without value addition
  - Frequent price fluctuation
  - lack of transparency in the trade
  - Instability and uncertainty of the market.
  - Minimum post harvest processing