(08) Agricultural Science

Structure of the Question Paper

Paper I - **Time : 02 hours**
50 multiple choice questions with 5 options. **All** questions should be answered.
Each question carries **02** marks. Total **100** marks.

Paper II - **Time : 03 hours.** (In addition, 10 minutes for reading.)
This paper consists of two parts as **Structured Essay** type and **Essay** type.

Part A - **Four structured essay** type questions. **All** questions should be answered. 100 marks for each question altogether 400 marks.

Part B - **Six essay** type questions. **Four** questions should be answered. each question carries 150 marks altogether 600 marks.

Total marks for paper II = 1000 ÷ 10 = 100

Calculation of the final mark
Paper I = 100
Paper II = 100
Final mark = 200 ÷ 2 = 100

Paper I

Important :

* Answer **all** questions.
* Select the **correct** or the **most appropriate** answer. (A multiple choice answer sheet would be provided at the examination.)

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1. The element needed for stomata movement and to regulate the osmotic pressure in the plant cells is
(1) N (2) P (3) K (4) Ca (5) Mg

2. A group of Bacteria living symbiotically with plants in family Poaceae while fixing nitrogen is
(1) *Azotobacter.* (2) *Clostridium.* (3) *Bacillus.*
(4) *Rhizobium.* (5) *Azospirillum.*

3. Height of the dwarf plants can be increased by applying
(1) Gibberellin. (2) Cytokine. (3) Auxin.
(4) Abscisic acid. (5) Ethylene.

4. Following are some chemicals used in tissue culture laboratories.
A - Clorox solution B - Ethanol
C - Teepol D - Formalin
Of above, the chemicals used for surface sterilization of an explant 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.

5. Factor/s affecting the rooting in layering would be

(1) plant species.
(2) maturity of the branch.
(3) plant species and maturity of the branch.
(4) plant species and bark thickness of the branch.
(5) maturity and bark thickness of the branch.

6. The process of the production of homozygous plants through self-pollination is known as

(1) cross breeding. (2) inbreeding. (3) cloning.
(4) mutation breeding. (5) pedigree breeding.

7. Amount of available water to a plant in a soil is expressed as,

(1) saturation – field capacity
(2) saturation – permanent wilting point
(3) field capacity – permanent wilting point
(4) saturation – hygroscopic water
(5) field capacity – hygroscopic water

8. In a soil, water holding capacity increases with the increase of,

(1) coarseness. (2) fineness. (3) compaction.
(4) random roughness. (5) consistency.

9. Few combinations of plant diseases and the way of spreading are given in the following table. The correct combination of the disease and the way of spreading is,

	Disease	way of spreading
(1)	ring spot	water
(2)	wilt	vector
(3)	rust	air
(4)	Soft rot	seeds
(5)	late blight	equipments

10. A pesticide bottle is labeled as "organic pesticide of plant origin". The chemical compound found in this pesticide would be,

(1) Endosulfan. (2) Diazinon. (3) Metaldehyde. (4) Pyrethrum. (5) Captan.

11. Following are nutritional compositions of 3 feed stuffs.

A - 40% protein, 10% fibre and 40% starch
B - 10% protein, 40% fibre and 10% Ash
C - 41% protein, 30% fat and 10% starch

Of above,

(1) A and C are protein supplements having similar energy values.
(2) A and B are roughage feeds.
(3) B and C are suitable for feeding poultry birds.
(4) A and B are suitable for feeding cattle.
(5) A and C are suitable for feeding poultry.

12. Consider the following statements in relation to human nutrition.

A - Both macronutrients and micronutrients are essential

B - Vitamins are classified as macronutrients

C - Essential fatty acids **cannot** be synthesized in a human body in required quantities

D - Lipid is a micronutrient

Of above, the correct statements are,

(1) A and B only.

(2) A and C only.

(3) B and C only.

(4) B and D only.

(5) C and D only.

13. The most suitable examples of food, to represent diversification and value addition are,

(1) flavored black tea and roasted rice flour respectively.

(2) rice flour noodles and bread respectively.

(3) chicken sausage and virgin coconut oil respectively.

(4) yoghurt and tomato sauce respectively.

(5) sterilized milk and ice-cream respectively.

14. Consider the following statements in relation to maturity indices.

A - Maturity indices are helpful in determining the correct stage of harvesting

B - Harvesting at the proper maturity stage gives higher yield

C - pH and starch granule shape are good maturity indices

D - Specific gravity and firmness are good maturity indices

Of above, the correct statements are,

(1) A and B only.

(2) B and C only.

(3) A, B and C only.

(4) A, B and D only.

(5) A, C and D only.

15. The soil health can be improved by,

(1) continuous application of inorganic fertilizers.

(2) continuous cultivation without a fallow period.

(3) frequent ploughing to a constant depth.

(4) practicing continuous monocropping.

(5) draining of excess water from the field.

16. "Hydroponics" can be best explained as growing plants in,

(1) misty environment containing plant nutrients.

(2) liquid media containing plant nutrients.

(3) soilless solid media containing plant nutrients.

(4) media containing demineralized water.

(5) any media using liquid fertilizer.

17. Following are some good harvesting and postharvest practices applicable for fruits.

A - Use of appropriate Brix value

B - Dipping in warm water

C - Harvesting in the evening

Of the above, the commonly used practice/s in harvesting mango to maintain its postharvest quality would be,

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

18. A change that occurs in soil due to primary land preparation is

(1) increasing bulk density. (2) increasing particle density.

(3) improving soil aeration. (4) decreasing random roughness.

(5) decreasing soil porosity.

19. An agriculture student observes that a Dry Zone farmer practices the following:

A - Cultivation of a single crop.

B - Production of planting materials by himself.

C - Planning his farming according to the weather pattern.

Of above, example/s for traditional agricultural practice/s would be

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

20. Following are some factors influencing the demand and supply of rice.

A - Labour cost

B - Selling price of the product

C - Fertilizer subsidy

D - Consumer income

Of the above, the factors that directly affect only to the market supply would be

(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.

21. GPS technology is mainly used in

(1) conservation farming. (2) organic farming.

(3) precision farming. (4) bio dynamic farming.

(5) integrated farming.

22. The following are some of the problems faced by the agriculture sector today.

A - Loss of agricultural biodiversity.

B - Reduction of farming population.

C - Susceptibility of plants to pest and diseases.

Of above, the example/s for **negative impact/s** of the green revolution would be

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

23. Following are some characteristics of a transmissible disease in livestock.

- Zoonatic disease
- Infected through non pasteurized milk or raw meat from infected animals
- causal organism is a bacteria
- muscle pain and excessive sweating are the major symptoms

The above disease would be,

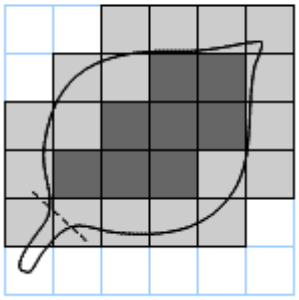
(1) Mad cow disease. (2) Leptospirosis. (3) Brucellosis. (4) Bird flu. (5) Swine flu.

24. Main steps of making grass silage in correct order are, cutting grasses
(1) filling the silo, making it air tight and pressing.
(2) filling the silo, pressing and closing.
(3) wilting, mixing, filling the silo and closing.
(4) filling the silo, adding water, pressing and closing.
(5) mixing with inoculants, filling the silo and closing.

25. The fat content of the cow's milk depends on
(1) the breed and the stage of the lactation.
(2) the breed and the method of milking.
(3) stage of lactation and the amount of minerals in the diet.
(4) method of milking and the amount of minerals in the diet.
(5) the amount of minerals in the diet and the breed.

26. An example for a rice value chain is,
(1) harvesting → collecting → storing → selling.
(2) harvesting → bulk storing → collecting → grading.
(3) Bulk storing → packing → grading → selling.
(4) Bulk storing → processing → packing → grading.
(5) harvesting → processing → collecting → marketing.

- **Use the following diagram to answer the question No. 27.**



27. According to the above diagram, the area of the leaf is
(1) 6 cm^2 . (2) 8 cm^2 . (3) 14 cm^2 . (4) 26 cm^2 . (5) 36 cm^2 .

28. The flow path of water from a water source to the main line in a drip irrigation system is given as,
(1) suction line, filter unit, pump and delivery line.
(2) suction line, pump, delivery line and filter unit.
(3) suction line, pump, filter unit and delivery line.
(4) suction line, delivery line, pump and filter unit.
(5) delivery line, pump, suction line and filter unit.

29. Examples for a fodder grass and a fodder legume are,
(1) CO_3 and *Erythrina* respectively.
(2) *Brachiaria* and *Erythrina* respectively.
(3) CO_3 and *Puraria* respectively.
(4) *Brachiaria* and *Puraria* respectively.
(5) *Guinea grass* and *Centrocema* respectively.

30. In relay cropping,

(1) Reproductive stages of the first crop and the second crop could be observed at the sametime in the field.

(2) Vegetative stages of the first crop and the second crop could be observed at the sametime in the field.

(3) Vegetative stage of the first crop and reproductive stage of the second crop could be observed at the sametime in the field.

(4) Reproductive stage of the first crop and vegetative stage of the second crop could be observed at the sametime in the field.

(5) Second crop is planted after harvesting the first crop.

31. With the increase of environmental temperature,

(1) hens will lay eggs with thick shells.

(2) physical activities and panting of cows will increase.

(3) all farm animals will drink more water.

(4) all farm animals will start sweating.

(5) production in some farm animals will be reduced.

32. Mist propagator is mainly used for rooting of cuttings. In a mist propagator, optimum

A - RH is maintained

B - temperature is maintained

C - level of nutrients is maintained

Of above, correct statement/s would be,

(1) A only. (2) B only. (3) C only.

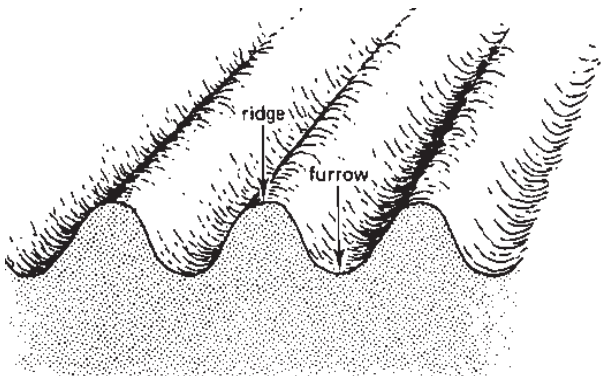
(4) A and B only. (5) A and C only.

33. The most suitable vegetative propagation technique for Rambutan is

(1) wedge graffing. (2) patch budding. (3) Air layering.

(4) Stem cuttings. (5) root cuttings.

• Use following diagram to answer question no. 34



34. A farmer wants to prepare soil beds in a large extent of his farm land as shown in the above diagram. The most suitable equipments he should use for this task in correct order are,

(1) Disc plough, ridger and rotavator. (2) Rotavator, mammoty and ridger.

(3) Mammoty, rake and mammoty fork. (4) Disc plough, tine tiller and ridger.

(5) Disc plough, tine tiller and moldboard plough.

35. Following are some characteristics of certain substrates

A - Good aeration
B - Good drainage
C - High bulk density
D - High water holding capacity

Of the above, suitable characteristics for a potting mixture would be,

(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. A vegetable crop has a root depth of 400 mm and the soil is irrigated when the total available water level of 60 mm depletes by 50%. The net irrigation requirement is

(1) 200 mm. (2) 120 mm. (3) 75 mm. (4) 60 mm. (5) 30 mm.

37. Consider the following data pertaining to a production process.

Urea (kg)	1	2	3	4	5
Yield (kg)	20	50	90	140	180

The average product when 4 kg of urea is used, and the marginal product when urea usage is increased from 4kg to 5 kg are,

(1) 35 and 40 respectively.
(2) 35 and 35 respectively.
(3) 35 and 50 respectively.
(4) 40 and 35 respectively.
(5) 40 and 50 respectively.

38. In designing a poly-tunnel for low country, the main factor to be considered is the reduction of

(1) relative humidity. (2) temperature.
(3) insect pest damages. (4) disease incidences.
(5) wind effects.

39. Following are some statements on active absorption of plant nutrients.

A - Nutrients are absorbed against the concentration gradient
B - Energy (ATP) is used in the process of nutrient absorption.

Of above,

(1) A is correct and B is incorrect.
(2) A is incorrect and B is correct.
(3) Both A and B are correct and A explains B.
(4) Both A and B are correct and B explains A.
(5) Both A and B are correct and there is no relationship between A and B.

40. The correct statement about weeds is,

(1) *Panicum repens* can be controlled through deep ploughing.
(2) All weeds serve as alternative hosts to insects and disease causing organisms.
(3) Weeds with hibernating seeds are easy to control.
(4) The weeds having both sexual and asexual propagation are difficult to control.
(5) All weeds can be destroyed by submerging in water.

41. Few statements about the biological control of pest are given below.

A - Both adult and larval stages of the parasitic insects always contribute to the biological control

B - There should be a good ability for the parasites to find the host

C - Predators must be host specific

D - Pathogens enter into the pest's body through mouth, cuticle and wounds.

Of the above, the correct statements would be,

(1) A and B only. (2) A and C only. (3) B and C only.

(4) B and D only. (5) C and D only.

42. In a poultry farm, it is observed that when the output increases average cost decreases. If so the marginal cost

(1) declines. (2) increases.

(3) changes. (4) remains below the average cost.

(5) remains above the average cost.

43. The most possible and the least possible reasons for spoilage of deep-fried food are,

(1) microbial actions and physical damages respectively.

(2) microbial actions and lipolytic enzymic reaction respectively.

(3) lipid oxidation and microbial action respectively.

(4) lipid oxidation and enzymatic browning reaction respectively.

(5) non-enzymatic browning reaction and lipolytic enzymic reaction respectively.

44. A student obtained two milk samples at the beginning and the end of a morning milking session, labeled them as A and B respectively and analyzed. The most possible observations would be,

(1) Lactose content in sample A is higher than sample B.

(2) Lactose content in sample B is higher than sample A.

(3) Fat content in sample A is higher than sample B.

(4) Fat content in sample B is higher than sample A.

(5) Fat and lactose content in both A and B samples remain constant.

45. When the difference between wet and dry bulbs' readings of wet and dry bulb thermometer is zero

(1) plants are subjected to wilt.

(2) evapotranspiration is increased.

(3) fungal diseases distribution is increased.

(4) plants are subjected to wilt and fungal diseases distribution is increased.

(5) evapotranspiration is increased and fungal diseases distribution is increased.

46. Of the following combinations of weather parameters and plant functions, a direct relationship can be observed in,

(1) rain fall and shoot: root ratio.

(2) quality of light and photoperiodism.

(3) duration of light and vernalization.

(4) wind velocity and transpiration.

(5) intensity of light and root growth.

47. An irrigation engineer recorded the following two factors which could be considered in selecting a water source for designing an irrigation system.

A - Seasonal water level fluctuations of a water source.

B - Seasonal water yield of the water source.

In designing an irrigation system using above water source

(1) Only A is important.

(2) Only B is important.

(3) Both A and B are important.

(4) Both are important and A depends on B.

(5) Both are important and B depends on A.

48. Following are two statements on primary land preparation

A - Compacted soil is opened or turned.

B - Weeds and stubbles are removed and soil is levelled.

Of above,

(1) A is correct and B is incorrect.

(2) A is incorrect and B is correct.

(3) Both A and B are correct.

(4) Both A and B are incorrect.

(5) Both A and B are correct and B further explains A.

49. Two statements about a soil profile are given below.

A - By studying a soil profile, eluviation and illuviation that take place in soil horizons can be identified.

B - More minerals are retained in "A horizon" due to the eluviation process.

Of the above statements,

(1) A is correct and B is incorrect.

(2) B is correct and A is incorrect.

(3) Both A and B are correct.

(4) A is correct and B further explains A.

(5) B is correct and A further explains B.

- **Use following statement and reason to answer questions No. 50.**

Statement :- Integrated farming is a sustainable farming system

Reason :- It is mainly due to the low labour requirement.

50. Of the above statement and reason,

(1) Both statement and reason are correct, statement is further explained by the reason

(2) Both statement and reason are correct, but statement is not explained by the reason.

(3) Statement is correct but reason is incorrect

(4) Statement is incorrect but reason is correct

(5) Both statement and reason are incorrect

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(08) Agricultural Science

Paper II

Important

* Answer **all** questions of Part A.
* Answer **four** questions only of part B.

Part A -Structured Essay

1. **(A)** Wet and dry bulb thermometer and maximum and minimum thermometer are placed in the Stevenson screen to record different weather parameters.

(i) State a reason for keeping the above instruments inside the Stevenson Screen.

.....

(04 marks)

(ii) State the reason for law temperature in the wet bulb thermometer compare to that of the dry bulb thermometer

.....

(04 marks)

(iii) A Student noticed both wet and dry bulb thermometer readings are similar while recording the data. State a reason for this error and a measure to rectify it.

Reason for Error **Rectification**

..... **(02 marks)** ..... **(02 marks)**

(iv) State how the maximum and minimum thermometer is adjusted after recording the data.

.....

(04 marks)

(B) Sustainable management of soil is vital to maintain high agricultural productivity in crop fields.

(i) State the importance of "A horizon" in a soil profile with respect to soil productivity.

.....

(04 marks)

(ii) Write **two** important information that can be inferred from soil colour.

(1) ..... **(02 marks)**

(2) ..... **(02 marks)**

(iii) State **two** visible characters of a degraded upland soil.

(1) ..... **(02 marks)**

(2) ..... **(02 marks)**

(C) A Student obtained the following data from an experiment on determining the soil texture by the hydrometer method.

- Wet weight of the soil sample - 50 g
- Moisture factor - 1.004
- Corrected hydrometer reading of the soil solution in two minutes - 12.43
- Corrected hydrometer reading of the blank solution in two minutes - 2.00

(i) Calculate the dry weight of the soil sample

.....

..... **(04 marks)**

(ii) Calculate the clay and silt percentages

.....

..... **(04 marks)**

(iii) Calculate the sand percentage

.....

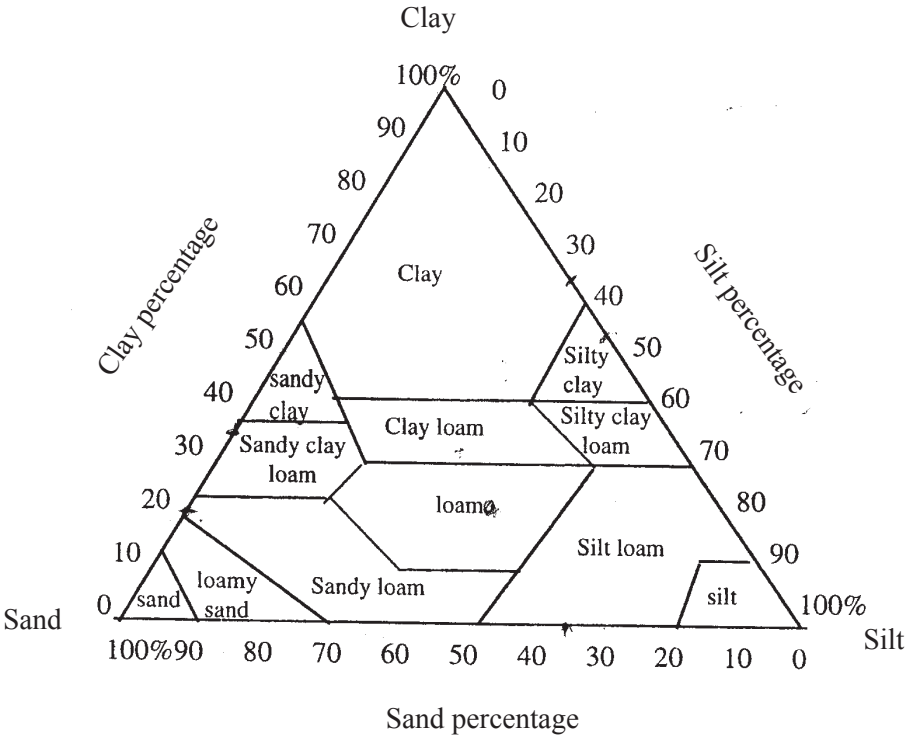
..... **(04 marks)**

(iv) If the silt percentage is 8.9%, Calculate the clay percentage

.....

..... **(04 marks)**

(v) Write texture category of the soil sample by using the given soil texture triangle.



..... **(04 marks)**

(D) State **three** government agencies that are responsible for fisheries and livestock sector development.

(1) ..... **(04 marks)**

(2) ..... **(04 marks)**

(3) ..... **(04 marks)**

(E) The Elements required for plant growth are known as plant nutrients.

(i) Name **three** properties that can be used to classify an element as an essential element.

(1) ..... **(02 marks)**

(2) ..... **(02 marks)**

(3) ..... **(02 marks)**

(ii) Name the character of an element which used to classify it as a mobile element.

..... **(02 marks)**

(iii) State **one** function for each of the following essential elements.

Element	**Function**	
(1) Phosphorus	.....	**(04 marks)**
(2) Pottasium	.....	**(04 marks)**

(iv) State an inorganic fertilizer in-order to correct each plant nutrients deficiency.

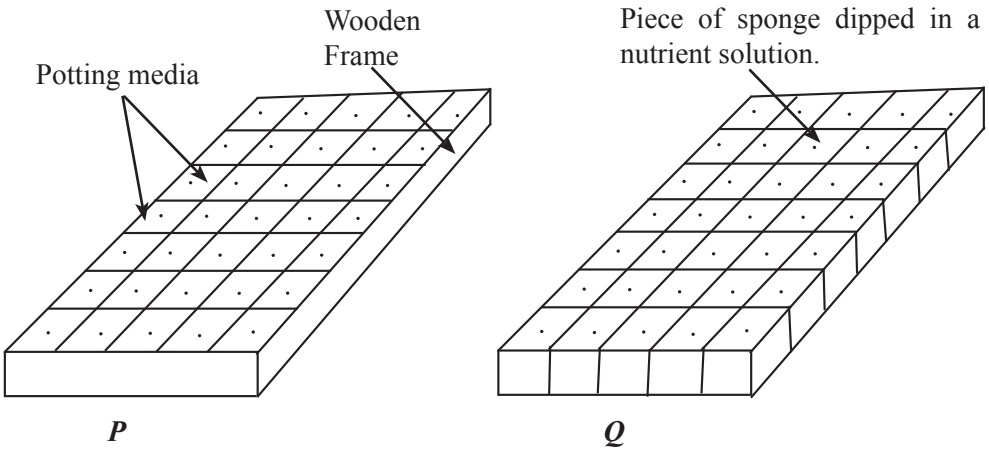
(1) Leaves of cereal crops turning purple ..... **(02 marks)**

(2) yellowing the matured leaves and ..... deformed flowers and fruits **(02 marks)**

(3) edges of leaves become burned like ..... **(02 marks)**

(4) curling and deforming of leaf tips ..... **(02 marks)**

(F) Nursery techniques are important in obtaining good quality planting materials in commercial agriculture.



(i) Name the **two** types of nurseries shown in figure "***P"*** and "***Q"***

(1) ***P*** - ..... **(02 marks)**

(2) ***Q*** - ..... **(02 marks)**

(ii) Name **two** suitable potting media to be used in *"P"*

(1) ..... **(02 marks)**

(2) ..... **(02 marks)**

(iii) Name **two** crops that are suitable to be propagated in "*P"* type nurseries, but unsuitable to be propagated in commonly used nurseries.

(1) ..... **(02 marks)**

(2) ..... **(02 marks)**

(iv) State a reason why the crop seeds mentioned above are unsuitable to be propagated in a common nursery

.....

.....

.....

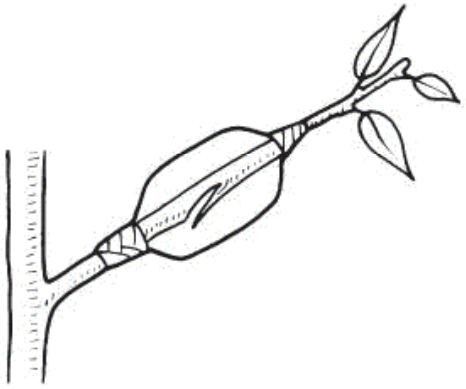
.....

..... **(02 marks)**

(v) Name a nutrient solution that can be used in nursery *"Q"*.

..... **(02 marks)**

2. (A) A common propagation method is shown in the following diagram.



(i) Name the above propagation method.

..... **(02 marks)**

(ii) State **two** fruits crops, which are commonly propagated by the above method.

(1) ..... **(02 marks)**

(2) ..... **(02 marks)**

(iii) State the physiological process leading to root initiation in above propagation method.

.....

.....

..... **(04 marks)**

(iv) State **two** advantages of the above propagation method compare to other vegetative propagation methods.

(1) ..... **(04 marks)**

(2) ..... **(04 marks)**

(B) Different vegetative propagation methods are use to propagate different crops.

(i) State most suitable vegetative propagation method for each of the following crops.

(1) Roses ..... **(02 marks)**

(2) Begonia ..... **(02 marks)**

(3) Mango ..... **(02 marks)**

(4) Rambutan ..... **(02 marks)**

(ii) State the vegetative propagation method suitable for combining desirable characters of two or more plants in a single plant.

..... **(04 marks)**

(iii) State **two** main differences between rhizome and corm.

(1) ..... **(02 marks)**

(2) ..... **(02 marks)**

(C) There are many factors need to be considered in designing a suitable irrigation system.

(i) State **two** important factors to be considered in selecting a water pump for a sprinkler irrigation system?

(1) ..... **(04 marks)**

(2) ..... **(04 marks)**

(ii) If the gross irrigation requirement of a crop field is 20 cm and water losses in the field is 5 cm, calculate,

(a) net irrigation requirement

.....

..... **(04 marks)**

(b) Irrigation efficiency

.....

..... **(04 marks)**

(iii) State an environmental problem created due to continuous excess irrigation.

..... **(04 marks)**

(iv) State a remedical measure to overcome above problem.

..... **(04 marks)**

(D) State the main function of each of the following plant hormones.

	Hormone	Main function	
(i)	Gibberellin		**(02 marks)**
(ii)	Auxin		**(02 marks)**
(iii)	Cytokinine		**(02 marks)**
(iv)	Ethylene		**(02 marks)**
(v)	Abscisic acid		**(02 marks)**

(E) Modern plant breeding methods to have many advantages as well as disadvantages.

(i) Define recombinant DNA technology.

.....

.....

.....

.....

.....

..... **(04 marks)**

(ii) State **two** advantages and two disadvantages of genetically modified foods.

(1) Advantages

(a) ..... **(02 marks)**

(b) ..... **(02 marks)**

(2) Disadvantages

(a) ..... **(02 marks)**

(b) ..... **(02 marks)**

(F) Protective structures are commonly use in commercial agriculture.

(i) State the most suitable protected structure for following crops.

(a) Bell paper ..... **(02 marks)**

(b) Tea nursery ..... **(02 marks)**

(ii) State the purpose of using temporary protected structures.

.....

..... **(04 marks)**

(G) Soilless culture is more popular in urban agriculture.

(i) State the reason for soilless culture has become popular in urban agriculture.

..... **(04 marks)**

(ii) State **two** soilless culture techniques commonly use in Sri Lanka.

(1) ..... **(04 marks)**

(2) ..... **(04 marks)**

3. **(A)** Pesticide application is used in pest control. Sprayers are used to apply pesticides.

(i) Name **two** types of sprayers used for pesticide application

(1) ..... **(04 marks)**

(2) ..... **(04 marks)**

(ii) State **two** data which are required to obtain for the calibration of a sprayer.

(1) ..... **(02 marks)**

(2) ..... **(02 marks)**

(iii) List **two** safety measures farmer should adopt prior to spraying of pesticides.

(1) ..... **(02 marks)**

(2) ..... **(02 marks)**

(B) Given below some weeds found in agricultural lands.

A – *Mimosa pigra*

B – *Cypres rotandus*

C – *Ageratum conyzoids*

D – *Panicum maximum*

Answer the following questions using the above weeds

(i) Mention the weed which could be classified under sedges with a underground stem

..... **(02 marks)**

(ii) Name the weed species that belong to poeceae family and difficult to control.

..... **(02 marks)**

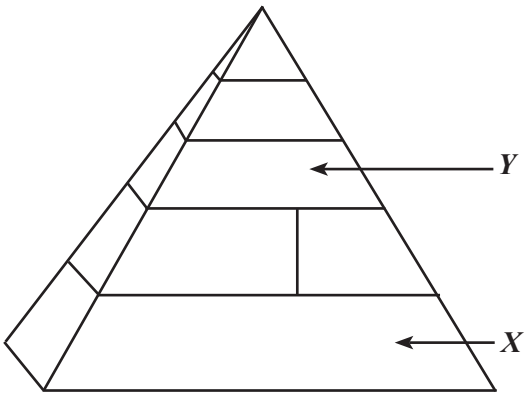
(iii) State the invasive weed species

..... **(02 marks)**

(C) Correct identification of pests is important to control pests successfully. Name the order and an insect pest with agricultural importance based on the characters given below.

Characters	Order	Pest
Possesses two pairs of wings and the first pair has become an elytra. Three pairs of legs attached to the thorax. Larvae and adult have biting mouth parts.	(i) ..... **(02 marks)**	(ii) ..... **(02 marks)**
Though the front pair of wings are uniformly hardened, it does not contribute for flying. Hind legs are adapted to jump. Nymph and the adult possess biting mouth parts.	(iii) ..... **(02 marks)**	(iv) ..... **(02 marks)**
The front wings of the adult are membranous and the second pair has become halters. The larvae damage the crops.	(v) ..... **(02 marks)**	(vi) ..... **(02 marks)**
Adults have pair of scaly wings. Though the larvae possesses biting type mouth parts, adults have spiral proboscis for sucking.	(vii) ..... **(02 marks)**	(viii) ..... **(02 marks)**

(D) Use the following diagram to answer the questions **(i)** and **(ii)**.



(i) Name **two** foods that falls into the group ***"X"***

(1) ..... **(02 marks)**

(2) ..... **(02 marks)**

(ii) Name **two** macronutrients provided by the food group ***"Y"***

(1) ..... **(02 marks)**

(2) ..... **(02 marks)**

(E) Malnutrition has become a serious nutrition problem in Sri Lanka.

(i) Name **four** factors causing under nutrition

(1) ..... **(02 marks)**

(2) ..... **(02 marks)**

(3) ..... **(02 marks)**

(4) ..... **(02 marks)**

(ii) Name **two** main micronutrient deficiencies found in Sri Lanka

(1) ..... **(02 marks)**

(2) ..... **(02 marks)**

(iii) State **two** nutritent complexities that can arise from obesity among school children

(1) ..... **(02 marks)**

(2) ..... **(02 marks)**

(F) Sustainable agricultural practices are important to minimize the impact of climate change.

(i) Define sustainable resource management in agriculture

.....

.....

.....

..... **(04 marks)**

(ii) Name **two** sustainable cropping pattern

(1) ..... **(02 marks)**

(2) ..... **(02 marks)**

(G) (i) Fruits can be categorized into two groups based on their ripening process. Name these two groups.

(1) ..... **(02 marks)**

(2) ..... **(02 marks)**

(ii) State the most significant maturity index for each of the following fruits.

Fruit	**Maturity index**	
(a) Mango	.....	**(02 marks)**
(b) Orange	.....	**(02 marks)**
(c) Banana	.....	**(02 marks)**

(iii) State **one** reason for each of the following postharvest practices.

Postharvest practice	Reason	
(a) Washing of latex from the fruit skin	.....	**(02 marks)**
(b) Dipping of fruits in cool water	.....	**(02 marks)**
(c) Grading of fruits based on maturity	.....	**(02 marks)**

(iv) Storage conditions are important in determining the shelf-life of agriculture produces. State the most important storage condition needed to be controlled in storing each of the following produces.

Produces	storage conditions	
(a) Paddy	.....	**(02 marks)**
(b) Onion	.....	**(02 marks)**
(c) Potato	.....	**(02 marks)**

(H) Excessive noise is a physical hazard resulted when heavy machinery is used in agriculture.

(i) State **two** causes for the generation of excessive noise in machines.

(1) ..... **(02 marks)**

(2) ..... **(02 marks)**

(ii) State **two** harmful impacts of excessive noise.

(1) ..... **(02 marks)**

(2) ..... **(02 marks)**

4. (A) Parts of the digestive systems of cattle and chicken are given below. Using arrow marks, match the parts of two digestive systems that are having similar main functions.

	Cattle digestive system	Chicken digestive system	
(1)	Mouth	Provarticulus	**(02 marks)**
(2)	Rumen	Gizzard	**(02 marks)**
(3)	Abomasum	Small intestine	**(02 marks)**
(4)	Duodenum	Large intestine	**(02 marks)**

(B) Before milking a cow, a farmer cleaned the cattle shed, washed the udder of the cow and slightly massaged the teats. He finished milking within 6 minutes after performing strip cup test. State the main reason for each of following activities.

	Activity		Reason	
(i)	Cleaning the cattle shed and the udder	-	.....	**(02 marks)**
(ii)	Massaging teats	-	.....	**(02 marks)**
(iii)	Performing strip cup test	-	.....	**(02 marks)**
(iv)	Completing milking within 6 minutes	-	.....	**(02 marks)**

(C) Compare to the artificial incubation, natural incubation of eggs have certain limitations. Indicate **three** such limitations.

(i) ..... **(02 marks)**

(ii) ..... **(02 marks)**

(iii) ..... **(02 marks)**

(D) Fill in the blanks of the following paragraph using appropriate words.

After the birth, calves should be fed with (i) ..... during first 3 days as it contains nutrients that can be absorbed without (ii) ..... When the calve is (iii) ..... months old, it can be weaned and fed with (iv) ..... and (v) ..... .

(2 × 5 marks)

(E) Name **two** bacterial diseases of cattle

(1) ..... **(02 marks)**

(2) ..... **(02 marks)**

(F) Dairy animals were imported to Sri Lanka to increase the milk production in the country.

(i) Name **two** cattle breeds imported for the above purpose

(1) ..... **(02 marks)**

(2) ..... **(02 marks)**

(ii) Name **three** government farms where these imported animals are rearing

(1) ..... **(02 marks)**

(2) ..... **(02 marks)**

(3) ..... **(02 marks)**

(iii) State **two** most critical weather parameters that affect milk production of these breeds

(1) ..... **(02 marks)**

(2) ..... **(02 marks)**

(iv) Write **two** technological applications used to provide the suitable environmental conditions for these animals

(1) ..... **(02 marks)**

(2) ..... **(02 marks)**

(G) (i) (1) State **two** main types of business management techniques.

(a) ..... **(02 marks)**

(b) ..... **(02 marks)**

(2) Of above,

(a) Name more suitable business management technique to Sri Lankan agri-business.

.....

..... **(02 marks**

(b) State the reason for the above answer.

.....

..... **(02 marks**

(3) Provide **four** major components of a business plan?

(a) ..... **(02 marks)**

(b) ..... **(02 marks)**

(c) ..... **(02 marks)**

(d) ..... **(02 marks)**

(ii) Assume the demand and supply functions for cowpea as P = 200 - 4QD and P = 6QS respectively where;

P = price per kg (in Rs.)

QD = quantity demanded per year in thousand metric tons.

QS = quantity supplied per year in thousand metric tons.

(1) Find the equilibrium price (Rs. per kg) and the quantity (in thousand metric tons)

(a) equilibrium price ..... **(04 marks)**

(b) equilibrium quantity ..... **(04 marks)**

(2) If the government imposes a certified price of Rs. 150 per kg of cowpea, what are the changes occur in quantity demand and quantity supplied?

(a) change in quantity demanded ..... **(04 marks)**

(b) change in quantity supplied ..... **(04 marks)**

(H) Suppose that the bird fever attacks the chicken production. What will happen to the demand, supply and the price of fish? (Assume fish is a substitute for chicken).

(Select the suitable answer: No change, shift to right, shift to left, increase, decrease)

(i) Market demand curve for fish ..... **(02 marks)**

(ii) Market supply curve for fish ..... **(02 marks)**

(iii) Equilibrium price of fish ..... **(02 marks)**

(I) (i) State **two** anthropogenic activities which leads to climate change.

(1) ..... **(02 marks)**

(2) ..... **(02 marks)**

(ii) State **two** changes occur in the rainfall pattern and the distribution due to climate change.

(1) ..... **(02 marks)**

(2) ..... **(02 marks)**

* *

Part B - Essay

5. **(i)** Explain the factors to be considered when selecting a suitable site for a plant nursery. **(50 marks)**

(ii) Compared to deep litter system, describe the advantage and disadvantages of free-range system of rearing laying hens. **(50 marks)**

(iii) Describe how adverse climatic conditions affect farm animal production **(50 marks)**

6. **(i)** Explain the ways the growth parameters can be used to measure plant growth. **(50 marks)**

(ii) Describe the impacts of soil erosion on agricultural productivity of a land. **(50 marks)**

(iii) Explain the importance of sustainable agriculture to maintain the eco-system health. **(50 marks)**

7. **(i)** Explain how plant breeding improves the genetic makeup of plants. **(50 marks)**

(ii) A student collected the following information from a crop field to determine irrigation requirements of the crop.

Field capacity of the Soil (volume basis)	=	40%
Permanent Wilting Point of the soil (volume basis)	=	25%
Depth of the root zone	=	40 cm
Management Allowed Depletion level	=	50%

(a) Calculate the net irrigation requirement.

(b) Calculate the gross water requirement if the irrigation efficiency of the irrigation system is 60%.

(c) Calculate the irrigation interval if the crop evapotranspiration is 4.8 mm/day. **(50 marks)**

(iii) Explain the physical factors that affect for food spoilage. **(50 marks)**

8. **(i)** Postharvest losses of fruits and vegetables are estimated to be approximately 40% is Sri Lanka. Explain the means by which the postharvest losses of fruits and vegetables can be minimized. **(50 marks)**

(ii) Describe the changes happened in the Sri Lankan agricultural sector after introduction of open economic policies in 1977. **(50 marks)**

(iii) Explain how to improve the inefficiencies in agricultural marketing in Sri Lanka. **(50 marks)**

9. **(i)** Describe the primary land preparation process of low land paddy cultivation in chronological order. **(50 marks)**

(ii) Describe the challenges faced by the present agriculture and the strategies to overcome those challenges. **(50 marks)**

(iii) Explain the importance of applying bio-fertilizer which is produced using soil microorganisms. **(50 marks)**

10. **(i)** Using appropriate examples, describe the role of different life forms in biological pest control.

(50 marks)

(ii) Mention the occupational hazards which would be possible to occur in an agricultural farm and explain the measures to prevent them. **(50 marks)**

(iii) Explain the importance of identifying agroecological zones in Sri Lanka to increase the productivity in agriculture sector. **(50 marks)**

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