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Open/Limited Competitive Examination for Recruitment to the Class II, Grade II of the
 Sri Lanka Agricultural Service – 2011 (2012)
 Part II (For Open Candidates)

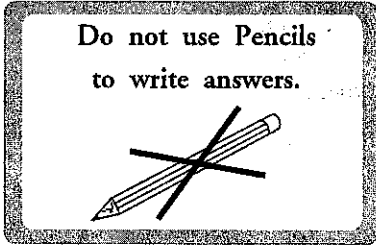
(24) Subject Matter Paper (Research Officer)
 Part 'A'

Two hours

Instructions to Candidates

Very Important

Do not use Pencils
 to write answers.



* Answerscripts where the numbers are not written as indicated below will not be marked / evaluated.

1 2 3 4

Write your Index Number here, on
 pages 3 and 5 in the
 space indicated.

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Checked as correct

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Invigilator's Initials

Important :

- * This paper consists of 75 questions on 09 pages.
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Page No.	Question Nos.	Marks awarded
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9	67 - 75	
Total		

Final Score

In figures	
In words	
Marking Examiner	
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● Select the correct or the most appropriate answer out of the four answers given for each question from No. 1 to 50 and write its number on the dotted line given against the question.

1. The term 'systematics' refers to:
(1) Identification and classification of plants and animals.
(2) Nomenclature and identification of plants and animals.
(3) Diversity of organisms and their relationship.
(4) Systematic approach in studying growth of plants and animals. (.....)

2. In the current taxonomic systems, a family is grouped into
(1) classes (2) phyla (3) orders (4) divisions (.....)

3. A part of a taxonomic classification of a crop species is given below.

Kingdom	Plantae
Sub Kingdom	Tracheobionta
Super Division	Spermatophyta
Division	Magnoliophyta
Class	Liliopsida
Order	Cyperales

Based on the above classification, the plant would be best described as a

- (1) gymnosperm that produces conidia.
(2) monocotyledonous vascular plant that produces seeds.
(3) non-vascular plant possessing leaf-like structure for water absorption.
(4) perennial plant having a deep root system. (.....)

4. Consider the following statements giving morphological features of a plant
(i) Does not have ligules.
(ii) Leaf is divided into sheath and blade.
(iii) Completes life cycle within a period of one year.

From the following, select the plant species that would best suit the above classification

- (1) *Cyperus rotundus* (2) *Isachne globosa*
(3) *Echinochloa crusgalli* (4) *Monochoria vaginalis* (.....)

5. True multi-cellularity occurs only in
(1) animals (2) plants and animals
(3) plants, animals and protozoas (4) plants, animals and fungi (.....)

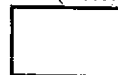
● For questions No. 6 and 7, select the correct set of words to fill in the blanks to complete the sentences.

6. The light reaction of the photosynthesis occurs in the and the dark reaction occurs in the of the chloroplast.
(1) cytochromes; stroma (2) thylakoid membrane; stroma
(3) reaction centres; cytochromes (4) stroma; cytochromes (.....)

7. Photosynthesis is a reaction, where water molecules are
(1) redox; oxidized (2) redox; reduced
(3) reducing; reduced (4) reducing; oxidized (.....)

8. Apogamy is
(1) formation of seeds in plants without fertilization.
(2) production of fruits without seeds.
(3) a method of propagation found in fungi.
(4) a method of propagation commonly observed in ferns. (.....)

9. What are the three events that take place during light reaction of photosynthesis?
(1) Reduction of oxygen, oxidation of NADPH, formation of ATP
(2) Oxidation of water, reduction of NADP⁺, formation of ATP
(3) Oxidation of water, reduction of NADP⁺, hydrolysis of ATP
(4) Release of oxygen, fixation of CO₂, hydrolysis of ATP (.....)



10. Which of the following shows the correct sequence of stages in glycolysis ?
 (1) glucose priming, cleavage and rearrangement, oxidation, ATP generation.
 (2) cleavage and rearrangement, glucose priming, ATP generation, oxidation.
 (3) glucose priming, oxidation, cleavage and rearrangement, ATP generation.
 (4) ATP generation, oxidation, glucose priming, cleavage and rearrangement. (.....)
11. Polyploidy refers to
 (1) extra copies of a gene exist adjacent to each other on a chromosome.
 (2) a condition with complete extra set of chromosomes.
 (3) a chromosome which has replicated but not divided.
 (4) multiple ribosomes present on a single mRNA. (.....)
12. DNA ligase is
 (1) an enzyme that joins fragments in normal DNA replication.
 (2) an enzyme involved in protein synthesis.
 (3) an enzyme of bacterial origin which cuts DNA at defined base sequences.
 (4) an enzyme that facilitates transcription of specific gene. (.....)
13. Auxin is synthesized in plants by
 (1) Adenine (2) Proline
 (3) Aspartine (4) Tryptophan (.....)
14. What are the assumptions of Hardy-Weinberg equilibrium?
 (1) small population, random mating, no selection, no migration, no mutation.
 (2) large population, random mating, no selection, no migration, no mutation.
 (3) large population, random mating, heterozygotes survive the best, no migration, no mutation.
 (4) large population, like individuals mate, no selection, no migration, no mutation. (.....)
15. The Polymerase Chain Reaction (PCR) is a technique that
 (1) is used to demonstrate DNA as a genetic material.
 (2) is used to determine the content of minerals in a soil sample.
 (3) is used to replicate specific DNA sequence in vitro.
 (4) measures the ribosome transfer rate during translation. (.....)
16. Mendel's first law states that
 (1) alleles from one parent mask the expression of alleles from the other parent.
 (2) alleles separate from each other before forming gametes.
 (3) hybrids will express a phenotype intermediate between the two parental phenotypes.
 (4) true-breeding parents produce offspring of the same phenotype. (.....)
17. The greatest loss of biodiversity is caused by
 (1) competition due to invasive alien species.
 (2) habitat alteration due to human activities.
 (3) pollution due to industrial development.
 (4) hunting to support human diet. (.....)
18. Reactions carried out with the involvement of bacteria are given by the following two equations.
 (i) $2\text{NH}_3 + 3\text{O}_2 \longrightarrow 2\text{NO}_2^- + 2\text{H}^+ + 2\text{H}_2\text{O}$
 (ii) $2\text{NO}_2^- + \text{O}_2 \longrightarrow 2\text{NO}_3^-$
 Which of the following statements is true about these equations ?
 (1) Reaction (i) is carried out by *Nitrobacter* bacteria.
 (2) Reaction (ii) is carried out by *Nitrosomonas* or *Nitrococcus* bacteria.
 (3) Both reactions (i) and (ii) are carried out by *Nitrococcus* bacteria.
 (4) Both reactions (i) and (ii) can be called nitrification. (.....)
19. The organisms that account for the greatest number of species are
 (1) insects. (2) bacteria.
 (3) birds. (4) plants. (.....)



20. Which of the following hormones is primarily responsible for enhancing apical dominance?
(1) Gibberellin (2) Auxin
(3) Abscisic acid (4) Cytokinin (.....)
21. Select the most correct statement with respect to a short day plant.
(1) Pr suppresses flowering. (2) Pfr stimulates flowering.
(3) Pr stimulates flowering. (4) Pfr suppresses flowering. (.....)
22. Light that passes through leaves of a tree inhibits germination of seeds found on soil because chlorophyll
(1) absorbs red and infra-red light.
(2) passes both red and infra-red light.
(3) absorbs infra-red light but passes red light.
(4) absorbs red light, but passes infra-red light. (.....)
23. Progeny Test evaluates the
(1) percent crossing over between two or more loci.
(2) amount of genetic recombinations between two or more individuals.
(3) performance of only self-pollinated individuals.
(4) performance of only cross-pollinated populations. (.....)
24. Which of the following is **not** an annual plant?
(1) Cabbage (2) Maize
(3) Sunflower (4) Rice (.....)
25. If a flower is to be pollinated by moths, it should be
(1) heavily scented (2) shaped like a diamond
(3) closed around noon time (4) brightly coloured (.....)
26. Some pathogens secrete an enzyme to breakdown the substance that holds the cells together. The enzyme is
(1) Cellulase. (2) Cutinase.
(3) Pectinase. (4) Proteinase. (.....)
27. "Damping Off" of crop seedlings in nurseries are caused by
(1) Bacteria (2) Virus
(3) Fungi (4) Mites (.....)
28. Select the correct set of words to fill the blanks in the following.
In traditional principles of point disease control, preventing the introduction of inoculum is called while preventing the infection by different methods is called
(1) avoidance; exclusion (2) exclusion; protection
(3) protection; resistance (4) avoidance; protection (.....)
29. Following are the symptoms of a plant disease observed by a farmer in his crop cultivation, "Water-soaked appearance, slimy and sticky texture, bad smell, irregular pattern, no colour change"
The most likely causal agent for the said disease is
(1) Bacteria (2) Virus
(3) Phytoplasma (4) Nematoda (.....)
30. Which of the following is **not** a Koch postulate?
(1) The same pathogen must be present in every case of disease.
(2) The pathogen must be isolated from the diseased host and grown in pure culture.
(3) The pathogen from pure culture must cause the disease when inoculated to a healthy susceptible laboratory plant.
(4) The pathogen must be isolated in pure culture from an experimentally infected laboratory plant. (.....)
31. Select the most correct statement that represents integrated pest management (IPM).
(1) A systems approach using multiple strategies.
(2) Focuses on strategies on biological control.
(3) Ensures that pesticides are not used.
(4) Uses a single strategy to control multiple pests. (.....)



32. The "action threshold" in pest management is best defined as the
 (1) level of pest population at which economic damage is done.
 (2) pest population level at which they must be controlled.
 (3) level of pest population that does the most significant damage to the crop.
 (4) pest population level that enables easy identification of the pest. (.....)
33. In Sri Lanka, *Acerophagus papayae* was used as a biocontrol agent to control
 (1) *Carica papaya* (2) *Paracoccus marginatus*
 (3) *Salvinia molesta* (4) *Chromolaena odorata* (.....)
34. Select the statement that best describes the "incomplete metamorphosis" of an insect.
 (1) Undergoes almost no structural changes during growth.
 (2) Has different forms but not drastically different.
 (3) Has different forms that are drastically different.
 (4) Undergoes radical changes in form and structure. (.....)
35. Following is a description of a growth stage of an insect.
 "Follows the complete-metamorphosis model, lacks compound eyes, has reduced antennae, and lacks external evidence of wing formation"
 The growth stage of an insect is
 (1) nymph (2) larva (3) pupa (4) adult (.....)
36. When cereal seeds germinate, amylase and other hydrolytic enzymes are secreted by the
 (1) scutellum (2) suspensor (3) aleurone layer (4) endosperm (.....)
37. Most plant tissue cultures are initiated from
 (1) calluses (2) explants (3) plantlets (4) anthers (.....)
38. The best choice to produce plants that are homozygous for all traits is
 (1) cell suspension culture (2) callus culture
 (3) anther/pollen culture (4) protoplast culture (.....)
39. The following statements provide possible reasons for that plant cells can be grown in tissue culture and regenerate new plants.
 (i) Each plant cell contains the entire genome.
 (ii) Plant cells have many procaryotic features.
 (iii) Plant cells can express genes that were not previously expressed.
 Of the above, the correct statement/s is/are
 (1) (i) only (2) (ii) only (3) (iii) only (4) (i) and (ii) only (.....)
40. "Plant transformation" is
 (1) increasing genetic variation in plants when grown in cell culture.
 (2) emergence of new plants when plant cells are grown in suspension culture.
 (3) incorporation of foreign DNA to plant genome.
 (4) the evolutionary history of a plant species. (.....)
41. What is the chemical formula for Sodium oxalate?
 (1) NaClO (2) NaClO₃ (3) Na₂ClO (4) Na₂C₂O₄ (.....)
42. Given below are statements indicating status of the Arsenic in environment.
 (i) A heavy metal.
 (ii) The twentieth most abundant element on the earth crust.
 (iii) According to WHO standards, the maximum allowable limit in bottled drinking water is 10 µg/l.
 Of the above, the correct statement/s is/are
 (1) (i) only (2) (ii) only (3) (iii) only (4) all (i), (ii) and (iii) (.....)
43. When a certain substance is oxidized it
 (1) gains electrons. (2) gains protons.
 (3) acts as an oxidizing agent. (4) acts as a reducing agent. (.....)



44. Which of the following challenges in the agriculture sector **cannot** be solved with transgenic techniques?
- (1) Crops are damaged by frost
 - (2) Crops are killed by a virus
 - (3) Crops are severely affected by an insect pest
 - (4) Public preference for organic vegetables (.....)

45. Consider the following statements that give reasons for the use of Carboxy Methyl Cellulose (CMC) in ice cream

- (i) Promotes lactose crystal growth
- (ii) Prevents ice crystal growth
- (iii) Provides freeze/thaw stability

Of the above, the correct statement/s reflecting the function of CMC is/are

- (1) (i) only
- (2) (ii) only
- (3) (i) and (ii) only
- (4) (ii) and (iii) only (.....)

46. Given below are fatty acids found in human diet

- (i) Alpha linolenic acid
- (ii) Linoleic acid
- (iii) Palmitic acid
- (iv) Stearic acid

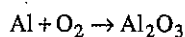
Of the above, the examples of gamma fatty acids are

- (1) (i) and (ii) only
- (2) (i) and (iii) only
- (3) (ii) and (iii) only
- (4) (ii) and (iv) only (.....)

47. What is the most concentrated solution from the following?

- (1) 1 mole of solute dissolved in 1 litre of water
- (2) 2 moles of solute dissolved in 3 litres of water
- (3) 6 moles of solute dissolved in 4 litres of water
- (4) 8 moles of solute dissolved in 6 litres of water (.....)

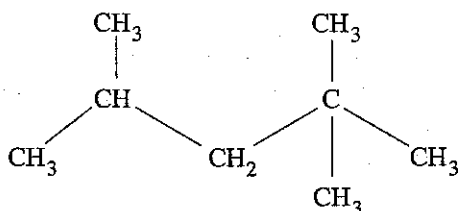
48. Given below is an unbalanced chemical equation:



What is the sum of co-efficients (number in front of chemical symbols) of the above equation when it is completely balanced?

- (1) 11
- (2) 9
- (3) 7
- (4) 5 (.....)

49. What is the IUPAC name of the following chemical substance?



- (1) 1, 3, 3-trimethylbutane
- (2) 2, 4, 4-trimethylpentane
- (3) 1, 1, 3, 3-tetramethylbutane
- (4) 1, 3-dimethylcyclohexane (.....)

50. The chemical properties of an element are mainly due to the

- (1) number and distribution of the outer electrons.
- (2) number and distribution of the inner electrons.
- (3) number and distribution of the neutrons.
- (4) total number of protons and electrons. (.....)



● For each question from No. 51 to 75 Write the correct answer on the dotted line given below each question.

51. "ELISA" is a technique used as a modern disease diagnostic tool. What does "ELISA" stand for?

.....

52. Define the following terms:

(i) Apogamy -

(ii) Parthenocarpy -

53. According to plant classification, name the family of the following crop species.

(i) *Camelia sinensis* -

(ii) *Hevia brasiliensis* -

54. What is the Mendel's law of "Independent Assortment"?

.....
.....

55. What are the two main causes of heritable variations?

.....
.....

56. What is meant by the term 'bioinformatics'?

.....

57. Seed dormancy helps plants to survive in the environment. State two important seed dormancy related characteristics that have made weeds survive better than majority of the crop plants.

.....
.....

58. Select the suitable words from the list given to fill in the blanks A, B, C and D in the following paragraph and write those answers against each English letter.

The list of words :- anther, ovule, stigma, plant, flower, pollen, ovary, petal, style, stamens

In cross-pollination, the ..A.. from a flower on one plant is transferred to the ..B.. of another plant of the same species. After fertilization, in a flower plant, the ..C.. becomes the seed and the ..D.. becomes the fruit.

A : B :

C : D :



59. Name **three** factors that are necessary for a plant disease to occur.

.....
.....

60. What is "photophosphorylation" that takes place during photosynthesis?

.....
.....

61. The following abbreviations stand for important international conventions/organizations related to environmental conservation. Elaborate/expand these abbreviations.

(i) CITES -

(ii) WWF -

62. What is the legal enactment in Sri Lanka that regulates importation and use of pesticides in the country?

.....

63. Give **two** characteristics to show how a bacterial cell differs from a plant cell.

.....
.....

64. State the main causal organisms of the following diseases found in the dry zone of Sri Lanka giving the scientific names.

(i) Rice sheath blight -

(ii) Anthracnose in chilli -

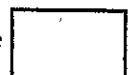
65. What are the cell structures in which the following functions take place?

(i) Respiration -

(ii) Photosynthesis -

66. What is the gas that is a main component of air pollution, but is essential in the upper atmosphere to protect life on earth?

.....



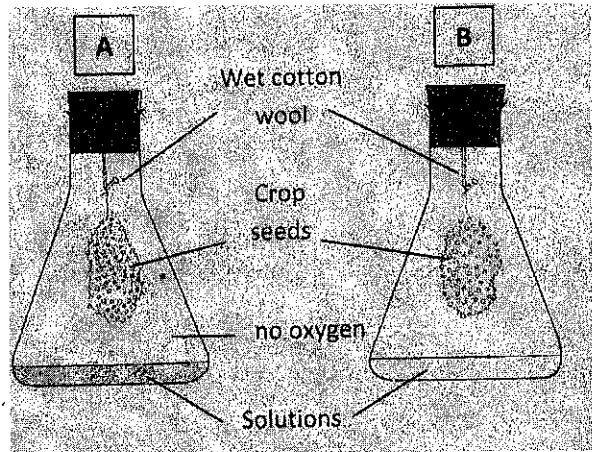
● Questions No. 67 to 68 are based on the experimental apparatus to test the hypothesis that “seeds need oxygen in order to germinate”.

67. (i) What is the function of the liquid in flask A?

.....
.....

(ii) What is the function of the liquid in flask B?

.....
.....



68. (i) The researcher has identified flask B as the control. What is the purpose of having this control?

.....

(ii) What is the result of the experiment you would expect if oxygen is **not** necessary for germination of crop seeds?

.....

69. (i) What is an “explants” culture?

.....

(ii) Name the bacteria that is known as the “natural genetic engineer” of plants.

.....

70. How much water would you add to one litre of a 5 molar solution of Sodium Phosphate to prepare a 500 millimolar solution of Sodium Phosphate?

.....
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● For each question from No. 71 to 75 fill in the blanks in given sentences using suitable words.

71. is the gas responsible for the ripening of fruits.

72. Golden rice is rich in precursor of

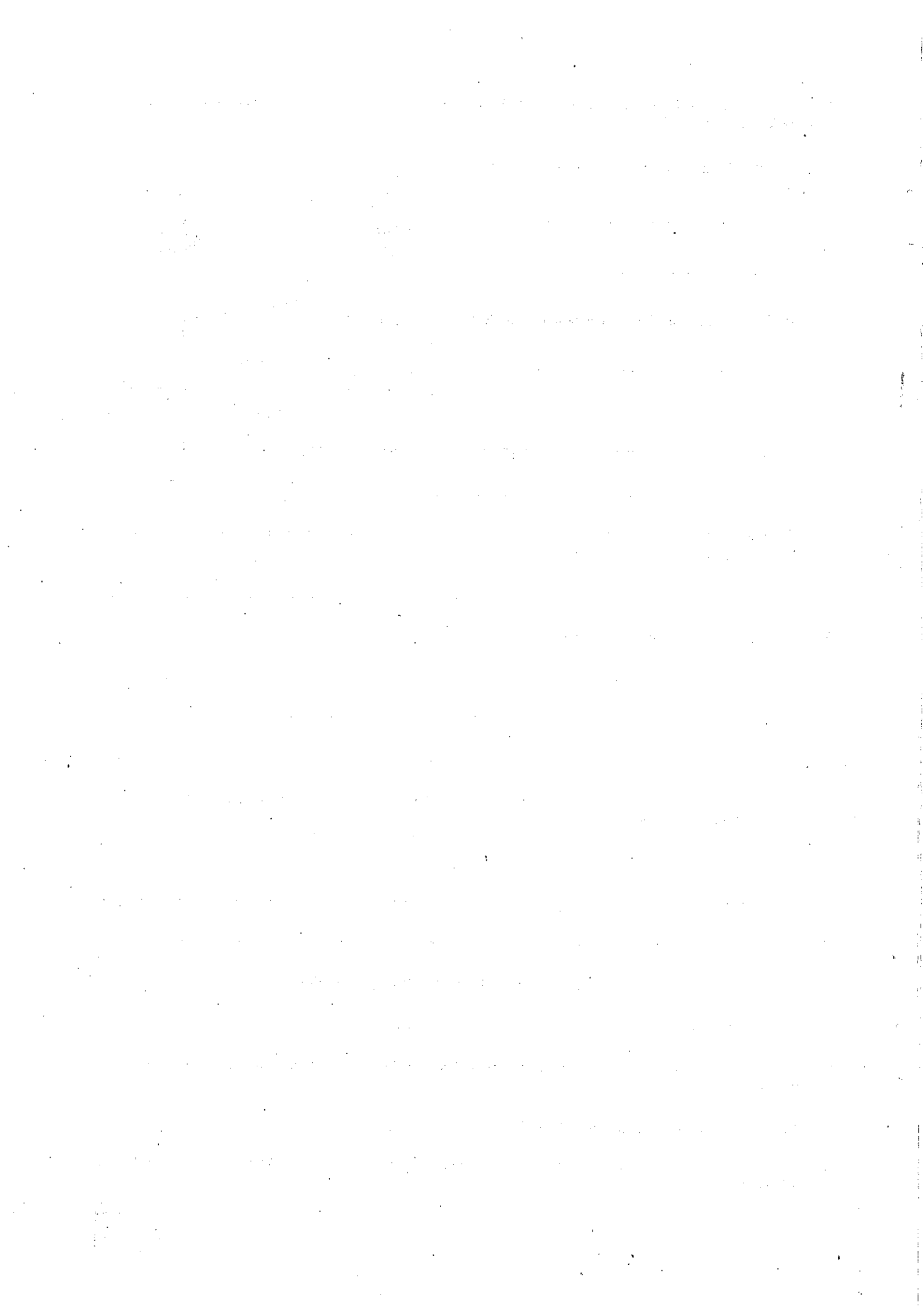
73. refers to an unorganized mass of cells, which are generally parenchymatous in nature.

74. Breeding associated with nucleic acid is known as

75. is the enzyme which inhibits pollen formation and hence prevents unnecessary pollination.

* * *





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Part II (For Open Candidates)

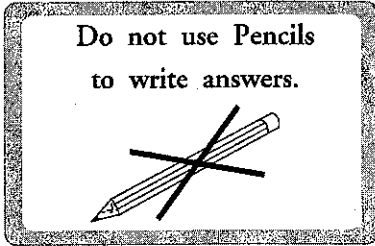
(24) Subject Matter Paper (Research Officer)
 Part 'B'

Two hours

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1 2 3 4

Write your Index Number here, on
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7	45 - 53	
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9	63 - 67	
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● Select the correct or the most appropriate answer out of the four answers given for each question from No. 1 to 50 and write its number on the dotted line given against the question.

1. Select the most correct statement from the following with respect to establishing a weather station.
- (1) Should be located at a place representing the physical and geographical characteristics of the region.
 - (2) Should be located at a place with adequate shade and in an area covering 10 m×10 m.
 - (3) Should be located closer to a pond or a reservoir.
 - (4) Should be located at a distance that is twice the height of the buildings in the surrounding area. (.....)

2. Consider the statements given below:
- (i) El Nino is characterized by unusually cool temperature in the Pacific Ocean.
 - (ii) La Nina is characterized by unusually warm temperature in the equatorial Pacific Ocean.
 - (iii) El Nino takes place when sea water that is warmer than usual exists off the coast of South America.

Of the above, the correct statement/s is/are

- (1) (i) only
 - (2) (ii) only
 - (3) (iii) only
 - (4) (i) and (ii) only (.....)
3. A "Roundup ready" crop
- (1) releases "Roundup" into the soil reducing competitive weeds.
 - (2) shows increased germination because the seeds are stratified.
 - (3) is an inserted gene that allows to survive being sprayed with "Roundup."
 - (4) has a genetic resistance to insects and insecticides. (.....)

4. Select the most correct statement from the following regarding the label on a pesticide product.
- (1) Contains legal jargon that helps an attorney during a court case.
 - (2) Should be read and understood by a farmer before the use of pesticides.
 - (3) Should be read completely regardless of understanding.
 - (4) Is required by law to have mixing instructions for the farmer. (.....)

5. What is the parameter that can be assessed by using the equation given below?

$$A = \frac{\text{Economic Production}}{\text{Biomass Production}}$$

- (1) Panicle emergence rate
 - (2) Rate of flowering
 - (3) Harvest Index
 - (4) Leaf production rate (.....)
6. Which of the following is **not** a basic principle of Agronomy?
- (1) Selecting suitable planting materials.
 - (2) Management of soil and climate.
 - (3) Intercropping in the agricultural land.
 - (4) Livestock management for Agriculture. (.....)
7. High root pressure can allow water to be lost from leaves through the process of
- (1) respiration.
 - (2) regulation.
 - (3) transpiration.
 - (4) guttation. (.....)

● Select the most appropriate words to fill in the blanks in the questions No. 8 and 9.

8. The micronutrient is required for chlorophyll synthesis.
- (1) Boron
 - (2) Iron
 - (3) Sulphur
 - (4) Iodine (.....)
9. The macronutrient is required for formation of coenzyme A.
- (1) Carbon
 - (2) Phosphorous
 - (3) Nitrogen
 - (4) Sulphur (.....)



10. Given below are the plant nutrients with their functions. Select the nutrient that is **incorrectly** matched with its function?
- (1) Calcium → formation of cell walls and maintenance of membrane integrity
 - (2) Pottassium → involved in operation of stomata
 - (3) Magnesium → component of chlorophyll
 - (4) Molybdenum → involved in osmotic regulation (.....)
11. "Water potential" is the
- (1) combination of turgor potential and pressure potential.
 - (2) difference between pressure potential and osmotic potential.
 - (3) combination of pressure potential and solute potential.
 - (4) product of pressure potential and osmotic potential. (.....)
12. Select the correct statement on mutations in population genetics.
- (1) Changes in allele frequencies are not dependent on the forces of natural selection and genetic drift.
 - (2) Mutation frequencies can be calculated from the frequency of homozygous recessive genotypic class alone.
 - (3) Except in situations of Hardy-Weinberg equilibrium, mutation plays a significant role in changing allelic frequencies.
 - (4) Mutation is a major force in generating genetic variability, but by itself plays a relatively insignificant role in changing allelic frequencies. (.....)
13. The progeny test evaluates the
- (1) breeding value of a single plant based on the performance of its offspring.
 - (2) percent crossing-over between two or more loci.
 - (3) amount of genetic recombination between two or more individuals.
 - (4) performance of only self-pollinated individuals. (.....)
14. What do "restriction enzymes" do?
- (1) Stop the transcription of DNA into mRNA
 - (2) "snip" DNA at certain base sequence
 - (3) "snip" the chains of certain amino acids in proteins
 - (4) Join up pieces of DNA (.....)
15. Which of the following is **not** a function of Mangrove swamps?
- (1) Protection of the coastline from erosion.
 - (2) Prevention from typhoon and hurricane damages.
 - (3) Entrapment of sediment remained from washing off the land.
 - (4) Facilitating salt mining. (.....)
16. The direct threat of climate change to marine habitat is
- (1) melting glaciers. (2) rising sea levels.
 - (3) spread of tropical diseases. (4) decreasing salinity of seawater. (.....)
17. "Tropism" is called
- (1) a movement in response to an external stimulus.
 - (2) a movement in response to light stimulus.
 - (3) a pigment that absorbs light and affects germination.
 - (4) a movement in roots in response to water levels. (.....)



18. Gibberellic acid is beneficial to the crops as it
- (1) reduces the number of leaves by suppressing lateral buds, to ensure the crop will not have many leaves to block each other's availability of light.
 - (2) hastens the ripening of fruits to ensure the seeds to be dispersed soon.
 - (3) increases stem and internodal elongation to make plants grow taller and have access to light.
 - (4) enhances synthesis of auxins to initiate seed germination under bright sunlight. (.....)

19. Consider the following statements written by a student with respect to plants having Crassulacean acid metabolism (CAM).

- (i) C3 plants grow where water is less limiting relative to C4 plants.
- (ii) The anatomy of the leaves establishes a spatial separation between C3 and C4 pathways.
- (iii) Stomata close during the day, reducing water loss.
- (iv) Have better water use efficiency in C3 plants than C4 plants under arid conditions.

Of the above, the correct statements are

- (1) (i) and (ii) only.
- (2) (i) and (iii) only.
- (3) (ii) and (iii) only.
- (4) (ii) and (iv) only. (.....)

20. Consider the following statements with regard to the activities of a beehive

- (i) Bees can remember their path of flying by using physical objects.
- (ii) Only male bees can carry pollen.
- (iii) The male : female ratio in a beehive is more than 1 : 25.

Of the above, the correct statement/s is/are

- (1) (i) only.
- (2) (ii) only.
- (3) (iii) only.
- (4) (i) and (iii) only. (.....)

- Questions No. 21 and 22 based on the following table giving metabolic process and possible locations in plants where they would take place.

Metabolic process	Glycolysis, citric acid cycle, pentose-phosphate pathway and Fatty Acid Synthesis
Possible locations	Cytoplasm, Mitochondrion

21. Of the above, the metabolic pathways that take place in Cytoplasm are

- (1) Glycolysis and citric acid cycle.
- (2) Glycolysis and pentose-phosphate pathway.
- (3) Citric acid cycle and pentose-phosphate pathway.
- (4) Citric acid cycle and fatty acid synthesis. (.....)

22. Of the above, the metabolic pathways that take place in Mitochondrion are

- (1) Glycolysis and citric acid cycle.
- (2) Glycolysis and pentose-phosphate pathway.
- (3) Citric acid cycle and pentose-phosphate pathway.
- (4) Citric acid cycle and fatty acid synthesis. (.....)

23. Consider the following statements with respect to mineral elements.

- (i) Absence of the mineral elements prevents the completion of the biological cycle.
- (ii) All these elements do not participate directly in plant metabolism.
- (iii) The mineral elements cannot be replaced by other elements with similar properties.

Of the above, the criterion/criteria that could be considered to determine the necessity of mineral elements on plant metabolism is/are

- (1) (i) only.
- (2) (ii) only.
- (3) (iii) only.
- (4) all (i), (ii) and (iii). (.....)



24. Which of the following is correct with respect to hygroscopic water.
- (1) Water found in deep aquifers and can be easily extracted for irrigation.
 - (2) Water held as a tight film around individual soil particles and unavailable to plants.
 - (3) Water that is available for plant uptake and human consumption.
 - (4) Hard water that contains large quantities of the Ca^{2+} and Mg^{2+} ions. (.....)
25. Clay minerals in soil are formed by
- (1) hydrogen and oxygen. (2) aluminium and silicon.
 - (3) calcium and magnesium. (4) sodium and potassium. (.....)
26. Select the **incorrect** statement from the following.
- (1) Rocks of different compositions weather at different rates.
 - (2) Heat and heavy rainfall increase the rate of chemical weathering.
 - (3) The presence of soil slows down weathering of the underlying bedrock.
 - (4) Breakdown of feldspar to form clay is an example for chemical weathering. (.....)
27. Osmosis is the diffusion of
- (1) water. (2) gases. (3) energy. (4) oil. (.....)
28. Rate of transpiration from a plant is high when
- (1) soil is wet and air is dry. (2) soil is wet and air is humid.
 - (3) soil is dry and air is humid. (4) both soil and air are dry. (.....)
29. Select the most correct statement from the following, with respect to an ecosystem.
- (1) Smaller organisms need less energy per gram of body weight than the larger organisms.
 - (2) Energy transfer between organisms normally involves conservation of heat energy.
 - (3) Energy flow between trophic levels is inefficient.
 - (4) Less than 10% of the energy is lost between levels of an energy pyramid. (.....)
30. Which of the following cellular processes normally produces ATP from glucose in the absence of oxygen?
- (1) Krebs cycle (2) Glycolysis (3) Calvin cycle (4) Hill reaction (.....)
31. A certain autosomal recessive trait is expressed in 1% of a population. Assuming that the population is in Hardy-Weinberg equilibrium, what is the percentage of individuals in the population that carry the gene but do **not** express the trait?
- (1) 10% (2) 18% (3) 27% (4) 35% (.....)
32. Ginger is propagated by
- (1) bulb. (2) corm. (3) rhizome. (4) runner. (.....)
33. The endosperm of a corn seed develops through the process of
- (1) pollination. (2) fertilization. (3) double fertilization. (4) germination. (.....)
34. The main feature that the soil taxonomic classification shares with the scientific classification of plants and animals is that both classification systems
- (1) include categories called kingdom and phyla.
 - (2) display the names of the upper level categories as part of the lower level category names.
 - (3) use only English words or names.
 - (4) follow a hierarchical structure where lower levels are subdivisions of higher categories. (.....)



35. From the following, select the correct soil order that proceeds from the least to the most highly developed and weathered profile.
- | | |
|-----------------------------------|-------------------------------------|
| (1) Vertisols, Entisols, Ultisols | (2) Vertisols, Alfisols, Oxisols |
| (3) Vertisols, Oxisols, Mollisols | (4) Spodosols, Vertisols, Mollisols |
- (.....)
36. A cross between two true breeding lines; one with dark blue flowers and one with bright white flowers, produces F1 offsprings that are light blue. When the F1 progeny are selfed a 1 : 2 : 1 ratio of dark blue : light blue : white flowers was observed. What is the genetic phenomenon consistent with these results?
- | | |
|---------------------------|--------------------------|
| (1) Variable expression | (2) Incomplete dominance |
| (3) Inbreeding depression | (4) Random mating |
- (.....)
37. Polyploidy refers to
- | |
|--|
| (1) an individual with complete extra sets of chromosomes. |
| (2) a chromosome which has replicated but not divided. |
| (3) multiple ribosomes present on a single mRNA. |
| (4) an inversion which does not include the centromere. |
- (.....)
38. Apogamy is
- | |
|--|
| (1) formation of seeds in plants without fertilization. |
| (2) secretion of substances by plants that are toxic to neighbouring plants. |
| (3) production of fruits without seeds. |
| (4) a propagation method commonly observed in ferns. |
- (.....)
39. Sheath blight in rice is caused by
- | | |
|--------------------------------------|--------------------------------------|
| (1) <i>Pyricularia oryzae</i> . | (2) <i>Thanatephorus cucumeris</i> . |
| (3) <i>Cochilobolus miyabeanus</i> . | (4) <i>Gibberella moniliforme</i> . |
- (.....)
40. Select the most correct statement that represents integrated pest management (IPM).
- | |
|--|
| (1) A systems approach using multiple strategies. |
| (2) Focuses on strategies on biological control. |
| (3) Ensures that pesticides are not used. |
| (4) A single strategy is used to control multiple pests. |
- (.....)
41. The action threshold in pest management is best defined as the
- | |
|---|
| (1) level of pest population at which economic damage is done. |
| (2) pest population level at which they must be controlled. |
| (3) level of pest population that does the most significant damage to the crop. |
| (4) pest population level that enables easy identification of the pest. |
- (.....)
42. If a flower is to be pollinated by moths, it should be
- | | |
|------------------------|--------------------------|
| (1) heavily scented. | (2) shaped like diamond. |
| (3) brightly coloured. | (4) dioecious. |
- (.....)
43. What are the assumptions of Hardy-Weinberg equilibrium?
- | |
|---|
| (1) small population, random mating, no selection, no migration, no mutation. |
| (2) large population, random mating, no selection, no migration, no mutation. |
| (3) large population, random mating, heterozygotes survive the best, no migration, no mutation. |
| (4) large population, like individuals mate, no selection, no migration, no mutation. |
- (.....)
44. Mendel's law of segregation states that
- | |
|--|
| (1) alleles from one parent mask the expression of alleles from the other parent. |
| (2) alleles separate from each other before forming gametes. |
| (3) hybrids will express a phenotype intermediate between the two parental phenotypes. |
| (4) different loci separate from each other. |
- (.....)



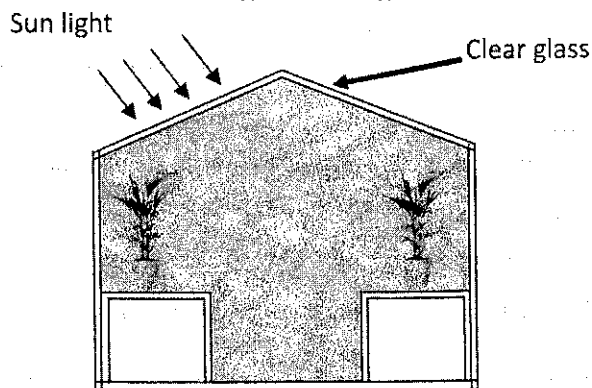
45. Herbacious perennials store food in their
(1) trunk. (2) roots. (3) leaves. (4) shoot. (.....)
46. In designing an experiment, blocking is used
(1) to reduce bias.
(2) to reduce variation.
(3) as a substitute for a control group.
(4) as the first step in randomization. (.....)
47. Consider the following statements.
(i) Based on careful use of control groups, experiments can often indicate cause-and-effect relationships.
(ii) While observational studies may suggest relationships, great care must be taken in concluding that there is cause and effect because of the lack of control over lurking variables.
(iii) A complete census is the only way to establish a cause-and-effect relationship absolutely.
Of the above, the correct statement/s is/are
(1) (i) only. (2) (ii) only. (3) (iii) only. (4) (i) and (ii) only (.....)
48. In 2010, the percentage contribution of the agriculture sector to GDP in Sri Lanka was
(1) 11.9. (2) 12.6. (3) 13.5. (4) 13.8. (.....)
49. The annual growth rate of Sri Lanka's economy in 2010 was
(1) 3.3%. (2) 6.9%. (3) 7.5%. (4) 8.0%. (.....)
50. Which of the following is **not** a Koch postulate?
(1) The same pathogen must be present in every case of disease.
(2) The pathogen must be isolated from the diseased host and grown in pure culture.
(3) The disease must be transmitted from a diseased plant to a healthy susceptible plant by some form of contact.
(4) The pathogen must be isolated in pure culture from an experimentally infected laboratory plant.(.....)

● For each question from No. 51 to 75 write the **correct answer on the dotted line** given below each question.

51. "RFLP" is a genetic marker used in molecular analysis. Expand the abbreviation "RFLP."

.....

52. What is the primary function of the clear glass in the green house shown in the diagram given below?



.....

53. Differentiate between 'weather' and 'climate.'

.....

.....



54. State two rainfall producing mechanisms in Sri Lanka.

.....
.....

55. State the precursors of the following plant hormones.

(i) Gibberelin :

(ii) Auxin :

56. Assuming Hardy-Weinberg equilibrium, what is the genotype frequency of heterozygotes, if the frequencies of the two alleles at the gene being studied are 0.6 and 0.4?

.....
.....

57. Indicate in the brackets whether the following statements are 'true' (T) or 'false.' (F)

(i) Propagation by cuttings involves planting a plant fragment, which does not possess any roots. (.....)

(ii) Grafting involves propagating an aerial plant structure on a wild plant. (.....)

58. Define the following terms.

(i) Vernalization :
.....

(ii) Seed Dormancy :
.....

59. (i) What is the organelle that produces the required energy of an animal cell?

.....

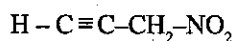
(ii) What is the organelle required to have photosynthesis in a plant cell?

.....

60. (i) What is the molarity of sodium chloride in a solution containing 0.5 mol of sodium chloride in 500 ml of water?

.....
.....

(ii) What is the total number of Pi bonds found in the following compound?



.....

61. What are the parameters used in a soil textural triangle to determine the soil textural class?

.....
.....

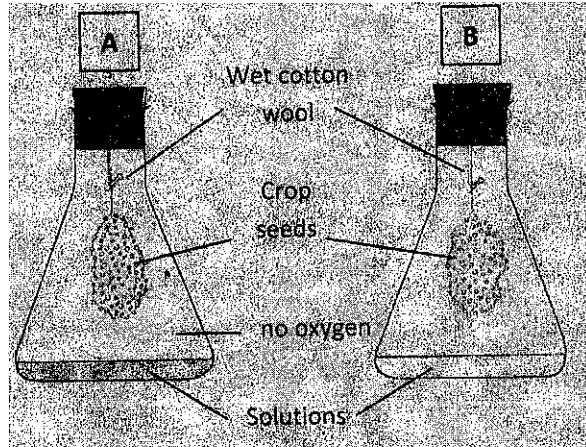
62. Give the scientific names of the following insect pests.

(i) Pea leaf miner :

(ii) Rice leaf folder :



- Questions No. 63 and 64 are based on the following diagram that represents an experiment set to test the hypothesis that “seeds need oxygen in order to germinate.”



63. (i) What is the function of the liquid in flask A?

 (ii) What is the function of the liquid on flask B?

64. (i) The researcher has identified flask B as the control. What is the purpose of having this control?

 (ii) What is the result you would expect if oxygen is **not** necessary for germination of crop seeds?

65. A scientist decided to test the presence of flower traits and its association with the colour of the flowers. He selected 300 flowering plants for the study and the results are shown below.

Presence of flower traits	Colour of the flower			
	Red	White	Other	Total
Yes	70	30	20	120
No	20	110	50	180
Total	90	140	70	300

- (i) What is the probability that a flower has red colour?

- (ii) What is the probability of having white flowers with flower traits, if the colour of flowers and the flower trait status were independent?

66. Indicate in the brackets whether the following statements are ‘true’ (T) or ‘false.’ (F)
- (i) Acid rains are formed due to the contribution from Oxygen and Nitrous Oxide. (.....)
- (ii) The group of organisms which converts light into food are called ‘heterotrophs.’ (.....)
67. Name **three** factors that are necessary for a disease to occur.



68. (i) What is an "explants culture"?

.....

(ii) Name the bacteria that is known as "the natural genetic engineer of plants."

.....

69. Insect ovipositors have **dual** purpose functions. What are they?

.....

.....

70. Name the legislation in Sri Lanka that regulates importation and use of pesticides in the country?

.....

● Fill in the blanks using suitable words of the following sentences from questions No. 71 to 75.

71. marks the division between immature insect stages.

72. 'Golden rice' is rich in precursor of

73. Evidence shows that some grasses are benefitted from being grazed. This plant-herbivore interaction is best described as

74. Cells found in multi-cellular organisms that are characterized by the ability to renew themselves through mitotic cell division and differentiating into a diverse range of specialized cell types are called

75. is defined as 'exotic plants that negatively affects the native biodiversity of the introduced environment.'

* * *



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 முழுப் பதிப்புரிமையடையது]
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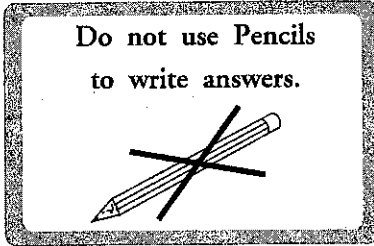
Open / Limited Competitive Examination for Recruitment to the Class II, Grade II of the
 Sri Lanka Agricultural Service – 2011 (2012)
 Part II (For Open Candidates)

(25) Subject Matter Paper (Agriculture Officer / Lecturer)

Two hours

Instructions to Candidates

Very Important



* Answerscripts where the numbers are not written as indicated below will not be marked / evaluated.

1 2 3 4

Write your Index Number here, on
 page 3 and 5 in the space
 indicated.

.....

Checked as correct

.....

Invigilator's Initials

Important :

- * This paper consists of 75 questions on 09 pages.
- * Before answering the paper arrange all the pages in order.
- * Answer all questions on this paper itself.
- * The time allowed is two hours.
- * Commence answering only after the Centre Supervisor's announcement.
- * Instructions given should be strictly followed in answering this paper and marks will not be awarded for answers not in accordance with these instructions.
- * Even if you are not attempting the paper hand it over to the Supervisor.
- * Write the answers clearly and legibly in blue or black ink only and not in pencil.
- * It is an offence to remove this paper from the examination hall or turn out photocopies of the same.
- * Answerscripts with illegible figures, illegible handwriting, those where erasing fluid has been used and written in pencil will not be marked / evaluated.

For Examiner's use only

Page No.	Question Nos.	Marks awarded
2	1 - 8	
3	9 - 20	
4	21 - 33	
5	34 - 45	
6	46 - 57	
7	58 - 64	
8	66 - 71	
9	72 - 75	
Total		

Final Score

In figures	
In words	
Marking Examiner	
Checked by	

- Select the **correct or the most appropriate answer** out of the four answers given for each question from No. 1 to 50 and write its **number on the dotted line** given against the question.

1. The leafy vegetable that carries the highest iron content is
 - (1) *Basella alba*
 - (2) *Alternanthera sessilis*
 - (3) *Lasia spinosa*
 - (4) *Ipomoea aquatica*(.....)

2. The risk of having 'Panama disease' in a banana plantation will increase with
 - (1) decreasing soil moisture level.
 - (2) increasing soil moisture level.
 - (3) increasing soil pH.
 - (4) decreasing soil pH.(.....)

3. In general, a budded mango plant bears fruits in
 - (1) 8 - 10 years.
 - (2) 6 - 7 years.
 - (3) 5 - 6 years.
 - (4) 3 - 4 years.(.....)

4. Select the correct statement regarding Super Phosphate fertilizer.
 - (1) Contains 35% phosphate and readily absorbed by the plant.
 - (2) Contains phosphate, 85% of which is soluble and capable in retaining in the soil.
 - (3) Contains 70% soluble phosphate and 20% of which is absorbed by the plant.
 - (4) Contains 70% phosphate which is slow releasing to the soil under wet condition.(.....)

5. Orange (*Citrus aurantium*) is recommended to be grown in
 - (1) low humid dry areas.
 - (2) high humid dry areas.
 - (3) low humid wet areas.
 - (4) high humid wet areas.(.....)

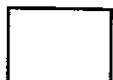
6. The moisture content of paddy at the recommended time of harvesting is
 - (1) more than 25%.
 - (2) between 19% - 23%.
 - (3) between 14% - 15%.
 - (4) between 10% - 12%.(.....)

7. Select the **incorrect** statement with regard to group extension methods.
 - (1) Effective only if the farmers in the group are at a similar knowledge level.
 - (2) Less expensive compared to individual extension method.
 - (3) Slow in transferring knowledge.
 - (4) Good interaction between the farmers and the extension officer.(.....)

8. Consider the following with regard to the responsibilities of an extension officer.
 - (i) Communicator and teacher
 - (ii) Director and organizer
 - (iii) Assistant and researcher
 - (iv) Organizer and assistant

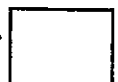
Of the above, the correct statements are

 - (1) (i) and (ii) only
 - (2) (ii) and (iii) only
 - (3) (iii) and (iv) only
 - (4) (i) and (iv) only(.....)



9. The most common soil type found in Sri Lanka is
(1) Red-yellow Podsollic. (2) Reddish Brown Earth.
(3) Alluvial. (4) Red-yellow Latosolic. (.....)
10. What is the main propagule in Cinnamon?
(1) Seeds (2) Runners (3) Matured stalk (4) Stalk with buds (.....)
11. Select the correct statement from the following statements.
(1) Chemical substances cannot be used in Integrated Pest Management (IPM).
(2) The recommended amount of fertilizer for sandy soil should be applied in small quantities repeatedly.
(3) Un-mixed fertilizer should be mixed a day before applying to a crop.
(4) Rock-phosphate is recommended for annual crops. (.....)
12. What is the nutrient in straw that is completely lost by burning?
(1) Silica (2) Carbon (3) Nitrogen (4) Calcium (.....)
13. Sprinkler irrigation method is **not** suitable for
(1) chilli and capsicum. (2) tomato and carrot. (3) lemon and orange. (4) pasture and fodder. (.....)
14. 'Furrow and Basin' methods of irrigation are mostly suitable for
(1) lemon. (2) onion. (3) banana. (4) maize. (.....)
15. Water should be supplied to a paddy field after broadcasting or transplanting in
(1) the first day itself. (2) between 4 - 6 days.
(3) between 8 - 10 days. (4) 14 days. (.....)
16. Select the most suitable answer to fill in the blank in the following sentence.
'Straw application to the paddy field will supply the total requirement of for the next cultivating season.'
(1) Nitrogen (2) Carbon (3) Potassium (4) Phosphorous (.....)
17. Hand sprayer used in agro-chemical application consists of
(1) liquid tank only. (2) pressure tank only.
(3) both liquid and pressure tanks. (4) liquid tank and mixing tank. (.....)
18. Select the correct statement with regard to insect pest control of a crop.
(1) The resistance in planting materials is not useful if the pest attack is severe.
(2) Incorporation of plant debris during bed preparation helps controlling pest.
(3) Weed control leads to effective control of pest.
(4) Crop rotation is not useful in controlling pest. (.....)
19. The Cation Exchange Capacity (CEC) of a soil measures
(1) the total cations in the soil.
(2) the amount of nutrients needed for the soil.
(3) the amount of nutrients available in the soil.
(4) the amount of nutrients leached from the soil. (.....)
20. The two main paddy cultivation seasons in Sri Lanka fall from
(1) April to September and October to March.
(2) April to August and October to February.
(3) May to September and November to March.
(4) May to August and November to February. (.....)

21. The colour used to indicate the lowest mammalian toxicity level on the labels of pesticide packs is,
(1) yellow. (2) blue. (3) green. (4) white. (.....)
22. Drought is better tolerated by
(1) seedling plants. (2) clones.
(3) tissue cultured plants. (4) vegetatively propagated trained plants. (.....)
23. What is the advantage of compost compared with the other organic fertilizers?
(1) Easy to store (2) Easy to apply
(3) Quick release of nutrients (4) Slow release of nutrients (.....)
24. The animal manure that gives the highest amount of nutrients is
(1) cow dung manure. (2) goat manure. (3) pig manure. (4) poultry manure. (.....)
25. The Integrated Pest Management (IPM) should be started,
(1) when there is a pest attack. (2) when the crop is at peak growing stage.
(3) when crop is about to bear flowers. (4) along with crop establishment. (.....)
26. What are the cities where crop breeding stations of the Department of Agriculture are located?
(1) Batalagoda, Gannoruwa, Labuduwa, Tinnaweli.
(2) Batalagoda, Gampaha, Labuduwa, Kalpitiya.
(3) Mahailuppallama, Geli Oya, Labuduwa, Tinnaweli.
(4) Mahailuppallama, Gampaha, Labuduwa, Rahangala. (.....)
27. MI - 5 and MI - 7 are the examples of locally bred varieties of
(1) chilli. (2) capsicum. (3) okra. (4) paddy. (.....)
28. 'Bibile' is a town famous for local orange variety. Similarly, 'Rahangala' is famous for local
(1) pears variety. (2) apple variety. (3) grapes variety. (4) strawberry variety. (.....)
29. Basal dressing is applied to paddy
(1) after first land preparation. (2) after second land preparation.
(3) along with impounding water. (4) after crop establishment. (.....)
30. Green gram, black gram, ground nut and cowpea
(1) are crops that could be harvested after 120 days.
(2) are pulse crops.
(3) are crops that are used in 'chena' cultivation.
(4) are leguminous crops. (.....)
31. The plant hormone that promotes seed dormancy is
(1) Auxin (2) Cytokinin (3) Ethylene (4) Gibberelin (.....)
32. Select the correct statement that describes a monocot.
(1) Seed without an endosperm.
(2) No secondary growth.
(3) Flower parts in multiples of 4's or 5's.
(4) Vascular bundles of stem arranged in a ring. (.....)
33. The water use efficiency of sprinkler irrigation is
(1) 95%. (2) 90%. (3) 85%. (4) 80%. (.....)



34. Select the correct statement with regard to the agriculture extension service.
- (1) The extension officer should always bring the farmers to the research field for the extension service to be effective.
 - (2) An effective extension service will help bringing solutions to biological constraints in the field and not to socio-economic constraints of farmers.
 - (3) The extension service is an adult education method.
 - (4) The extension service is not always a two-way communication. (.....)
35. The most effective way of educating adults is
- (1) giving more theory based knowledge.
 - (2) using one method of education.
 - (3) using the same time of the day for education.
 - (4) giving instructions repeatedly. (.....)
36. The plant that is vegetatively propagated through a corm is,
- (1) carrot.
 - (2) banana.
 - (3) radish.
 - (4) ginger. (.....)
37. Which of the following, shows the correct order of weeds that represents grasses, sedges and broadleaves, respectively?
- (1) *Echinochloa crusgalli*, *Monochoria vaginalis*, *Cyperus rotundus*.
 - (2) *Eichhorinia crassipes*, *Echinochloa colona*, *Salvinia molesta*.
 - (3) *Isachne globosa*, *Echinochloa crusgalli*, *Cyperus iria*.
 - (4) *Ischaemum rugosum*, *Cyperus esculentus*, *Ludwigia octovalvis*. (.....)
38. Two vegetables belonging to family Cucurbitaceae are
- (1) bittergourd and okra.
 - (2) bittergourd and pumpkin.
 - (3) brinjal and okra.
 - (4) brinjal and pumpkin. (.....)
39. 'Matale green' is a variety of
- (1) bittergourd.
 - (2) maize.
 - (3) winged bean.
 - (4) brinjal. (.....)
40. The best time of harvesting paddy is when
- (1) 100% panicles are yellow in colour.
 - (2) 98% panicles are yellow in colour.
 - (3) 90%-95% panicles are yellow in colour.
 - (4) 80%-85% panicles are yellow in colour. (.....)
41. The standard unit that expresses the water requirement of a crop is
- (1) cubicmetres.
 - (2) litres.
 - (3) acre feet.
 - (4) hectare feet. (.....)
42. The ratio of surface soil to organic manure in a potting mixture is
- (1) 1 : 1.
 - (2) 2 : 1.
 - (3) 1 : 2.
 - (4) 3 : 1. (.....)
43. Incorporation of excess amount of lime to the soil will reduce the plant availability of
- (1) calcium.
 - (2) potassium.
 - (3) phosphorous.
 - (4) sodium. (.....)
44. The water content of a soil, where the water availability for a plant is the maximum, is known as
- (1) wilting point.
 - (2) water holding capacity.
 - (3) field capacity.
 - (4) capillary water content. (.....)
45. 'Ambalawi' is a
- (1) mango variety recommended for the dry zone of Sri Lanka.
 - (2) mango variety recommended for the wet zone of Sri Lanka.
 - (3) mango variety recommended for the intermediate zone of Sri Lanka.
 - (4) jackfruit variety recommended for the dry zone of Sri Lanka. (.....)



46. When Ammonium Sulphate is used as a fertilizer
(1) the soil gets 45% nitrogen. (2) the soil gets 40% sulphur.
(3) the soil acidity is increased. (4) the soil acidity is decreased. (.....)
47. Thinning of plants in nurseries is necessary to
(1) increase the number of nursery plants.
(2) get uniform growth of all the nursery plants.
(3) prepare the plants for field conditions.
(4) remove the disease plants from the nursery. (.....)
48. What is the seed requirement of green chili to cultivate one hectare of land?
(1) 0.5 kg (2) 1 kg (3) 1.5 kg (4) 2 kg (.....)
49. The soil that is best suited to prepare a nursery is
(1) sandy loam soil. (2) sandy soil.
(3) immature loam soil. (4) brown loam soil. (.....)
50. A nursery bed is sterilized by burning
(1) two layers of straw and one layer of paddy husk on a dry bed.
(2) two layers of paddy husk and one layer of straw on a dry bed.
(3) two layers of straw and one layer of paddy husk on a wet bed.
(4) two layers of paddy husk and one layer of staw on a wet bed. (.....)

● For each question from No. 51 to 75 write the correct answer on the dotted line given below each question.

51. What is meant by 'leafy vegetables'?
.....
52. What is the maximum slope of a land that is allowed for cultivation?
.....
53. Name the main vitamin found in the following food categories.
(i) Leafy vegetables
.....
(ii) Fruits
.....
54. Name two methods used in food preservation.
.....
.....
55. What are the four elements that should be included in communication?
.....
.....
.....
56. Name two communication methods commonly used in agriculture extension.
.....
.....
57. Name two government institutes that provide extension services for farmers.
.....
.....



58. (i) According to the most recent classification, how many agro-ecological regions are there in Sri Lanka?
.....
- (ii) Expand the following abbreviations used in identifying agro-ecological regions in Sri Lanka according to the above classification.
- (a) DL₂ :
- (b) WM₃ :
- (c) IM₁ :

59. Name **one** biotic and **one** abiotic factor considered in the recent classification of agro-ecological regions.
- (i) Biotic factor
.....
- (ii) Abiotic factor
.....

60. (i) In fertilizer application, what is meant by 'Top Dressing'?
.....
- (ii) Give the nutrient requirements as N:P:K ratio for the following crops.
- (a) Beans :
- (b) Tomato :
- (c) Maize :

61. List **two** methods of soil conservation applied in cultivating a slopy land.
.....
.....

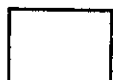
62. Name **two** popular varieties grown in Sri Lanka for each of the crops given below.
- (i) Tomato
.....
- (ii) Rambutan
.....

63. (i) What is the enactment in Sri Lanka that regulates the exportation of plant materials?
.....
- (ii) According to the above enactment, what is the responsible government department in issuing the permit to export plant materials?
.....

● For each question from No. 64 to 66, select the correct answer from those given in the paranthesis to fill the blank and write that **answer on the dotted line**.

64. (i) are two Durian varieties commonly grown in Sri Lanka.
(Mursi and Kasun / Kasun and Ambatenna / Ambatenna and Pulathisi)
- (ii) When Indian gooseberry (Nelli), Lemon and Pomegranate are arranged in a descending order according to the vitamin C content, it reads as
- (Indian gooseberry > Lemon > Pomegranate / Lemon > Indian gooseberry > Pomegranate / Pomegranate > Indian gooseberry > Lemon)

65. (i) The "Bordeaux mixture" consists of
($\text{CaSO}_4 + \text{CaCl}_2 + \text{H}_2\text{O}$ / $\text{CuSO}_4 + \text{NaCl} + \text{H}_2\text{O}$ / $\text{CuSO}_4 + \text{CaCO}_3 + \text{H}_2\text{O}$)
- (ii) Ammonium sulphate contains sulphur.
(21%, 46%, 60%)
66. (i) The best method of applying paddy husks into a paddy field is in
(fresh form / ground form / charcoal form)
- (ii) Calcium carbonate is used in cultivation as a
(fertilizer / pest control technique / soil conditioner)
67. (i) What is the government institute/centre responsible for avoiding the entry of alien plant diseases and pests to the Sri Lanka?
.....
- (ii) What is the responsible government department in implementing the activities of the institute/centre given above.
.....
68. Answer the following questions based on the given list of symptoms in potato plants.
- * Black spots on leaves
 - * Leaves become yellow colour
 - * Purplish brown colour tubers
 - * Stunted plants
- (i) What are the **two** symptoms that help you to decide these plants are having 'late blight'?
.....
- (ii) What are the **two** symptoms that help you to decide these plants are having 'leaf mosaic'?
.....
69. Give **two** examples each for the following categories of crops.
- (i) Under-utilized fruit species.
.....
- (ii) Cash crops recommended for dry zone.
.....
70. (i) What is the legal enactment that is responsible in enhancement and sustaining the productivity of soil in Sri Lanka?
.....
- (ii) What is the responsible Ministry in implementation of the above enactment?
.....
71. Name the countries where the headquarters of the following international organizations are located.
- (i) International Maize and Wheat Improvement Centre (CIMMYT)
.....
- (ii) World Agroforestry Centre (ICRAF)
.....



72. (i) State **two** activities that help in pest control in organic farming.
.....
.....

(ii) What is the reason of the pathogenic bacteria to get destroyed during the process of compost preparation?
.....

73. Write the scientific names completely of the following crops.

(i) Mango
.....

(ii) Jack fruit
.....

74. Name the institutions responsible for the activities given below.

(i) Crop insurance in Sri Lanka
.....

(ii) Activities related to living organisms in food production in the world
.....

75. Select the most suitable answer from those given in the parenthesis and write that answer **on the dotted line**.

(i) can be used as a bio-fertilizer.
(Aspergillus / Rhizobium / Azolla)

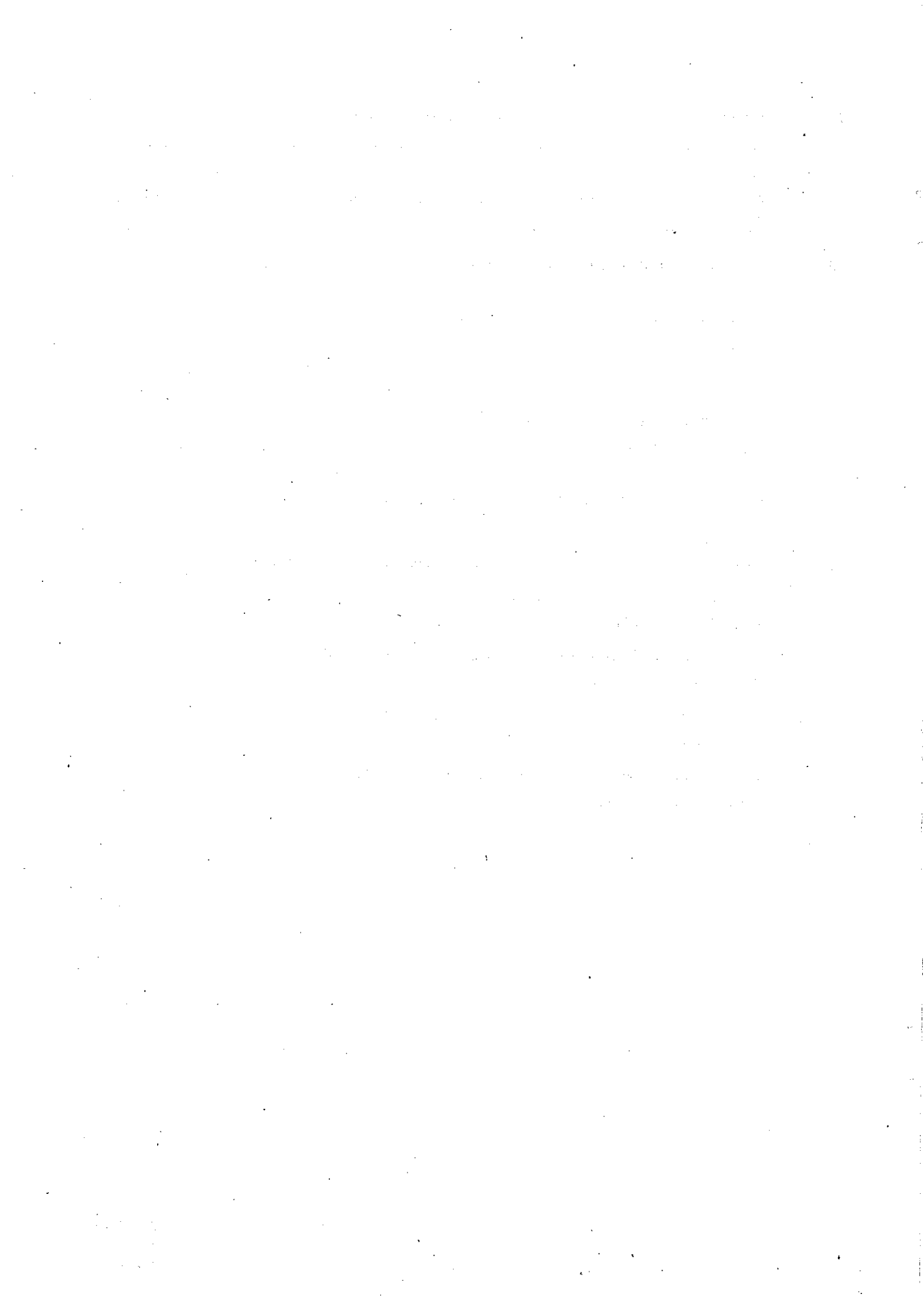
(ii) is used in mixing fertilizer as an inert material.
(Sand / Cement / Coir-dust)

(iii) BG 34-8 is a month old paddy variety.
(3 / 3.5 / 4)

(iv) should be applied immediately after application of fertilizer.
(pesticides / water / mulch)

* * *





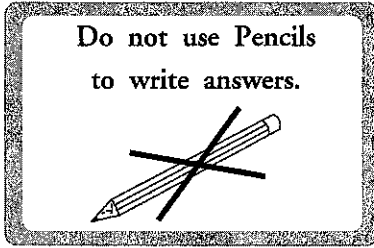
Open / Limited Competitive Examination for Recruitment to the Class II, Grade II of the
 Sri Lanka Agricultural Service – 2011 (2012)
 Part II (For Open Candidates)

(26) Subject Matter Paper (Agricultural Economist)

Two hours

Instructions to Candidates

Very Important



* Answerscripts where the numbers are not written as indicated below will not be marked / evaluated.

1 2 3 4

Write your Index Number here, on page 3 and 5 in the space indicated.

.....

Checked as correct

.....

Invigilator's Initials

Important :

- * This paper consists of 75 questions on 10 pages.
- * Before answering the paper arrange all the pages in order.
- * Answer all questions on this paper itself.
- * The time allowed is two hours.
- * Commence answering only after the Centre Supervisor's announcement.
- * Instructions given should be strictly followed in answering this paper and marks will not be awarded for answers not in accordance with these instructions.
- * Even if you are not attempting the paper hand it over to the Supervisor.
- * Write the answers clearly and legibly in blue or black ink only and not in pencil.
- * It is an offence to remove this paper from the examination hall or turn out photocopies of the same.
- * Answerscripts with illegible figures, illegible handwriting, those where erasing fluid has been used and written in pencil will not be marked / evaluated.

For Examiner's use only

Page No.	Question Nos.	Marks awarded
2	1 - 9	
3	10 - 19	
4	20 - 28	
5	29 - 37	
6	38 - 50	
7	51 - 59	
8	60 - 67	
9	68 - 71	
10	72 - 75	
Total		

Final Score

In figures	
In words	

Marking Examiner	
Checked by	

- Select the **correct or the most appropriate answer** out of the four answer given for each question from No. 01 to 50 and write its **number on the dotted line** given against the question.

1. Which of the following shifts the production possibilities frontier for a farm?
 - (1) Increasing all prices by 5%.
 - (2) Borrowing money to buy a tractor and hire more workers.
 - (3) Changing the composition of farm outputs.
 - (4) Allocating more provisions for welfare of workers. (.....)

2. "A capital good in a farm" means
 - (1) sacrifices of future goods for the production of present goods.
 - (2) reducing current productivity for increase in future productivity.
 - (3) using to produce goods for the future.
 - (4) allowing more consumption today. (.....)

3. A market surplus exists, when the
 - (1) quantity demanded is greater than the quantity supplied.
 - (2) quantity supplied is greater than the quantity demanded.
 - (3) supply curve shifts to the left.
 - (4) demand curve shifts to the right. (.....)

4. When the price of wheat flour increases, the
 - (1) supply curve for rice will shift to the right.
 - (2) demand curve for rice will shift to the right.
 - (3) equilibrium price and quantity of rice will not change.
 - (4) quantity of rice demanded will decline. (.....)

5. When income increases,
 - (1) the slope of the budget line will increase.
 - (2) individual demand will not change.
 - (3) budget line will shift parallelly.
 - (4) indifference curve will shift right. (.....)

6. Which of the following statements implies "more is preferred to less"?
 - (1) Indifference curves bow towards the origin.
 - (2) Indifference curves never intersect.
 - (3) Indifference curves have a negative slope.
 - (4) When income increases indifference curves will shift. (.....)

7. If a 20% increase in price will decline the quantity demanded by 10%, then the price elasticity of demand is
 - (1) 0.5
 - (2) 2.0
 - (3) 10
 - (4) 30 (.....)

8. According to the concept of optimum input quantity, a firm can increase the level of inputs until
 - (1) MPP is maximized.
 - (2) $MVP = \text{Price of the input}$
 - (3) $AC = \text{Price of the input}$
 - (4) $MVP = 0$ (.....)

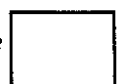
9. There are 20 workers in a farm. With the hiring of 21st worker, the total output of the farm declined. Which of the following is **not** necessarily true?
 - (1) The production exhibits decreasing returns to scale.
 - (2) The MPP of the last worker is negative.
 - (3) The MVP of the last worker is negative.
 - (4) The production exhibits diminishing marginal returns. (.....)



10. The demand curve shows the curve of
(1) marginal revenue. (2) total revenue.
(3) average revenue. (4) variable revenue. (.....)
11. At the level of output that maximizes profits
(1) the average cost is minimized.
(2) the difference between average revenue and average cost is maximized.
(3) the marginal cost is minimized.
(4) an increase in output will yield negative marginal profits. (.....)
12. In a farm, when the fixed cost decreases which of the following will be affected?
(1) Marginal profit.
(2) Profit maximizing output level.
(3) Total revenue at the profit maximizing output level.
(4) Total profit. (.....)
13. The main objective of the agricultural price support programmes is to
(1) maintain extra stocks of products. (2) keep government control over agriculture.
(3) stabilize farm income. (4) reduce competition. (.....)
14. In agriculture, when unexpected changes in output is found, the price changes tend to be large. This is because
(1) the demand for agricultural output is inelastic.
(2) the demand for agricultural output is elastic.
(3) the supply of agricultural output is elastic.
(4) there is a change of income of the consumers. (.....)
15. Assume that the government purchases all the agricultural surpluses and sells the stocks when there are shortages. Then
(1) farmers' revenue will be proportional to their output.
(2) resource poor farmers will benefit the most.
(3) consumers will be better off.
(4) large farmers do not get incentives to expand the output. (.....)
16. The average productivity of a farm declines
(1) usually over all ranges of output. (2) due to hiring of low-skilled workers
(3) usually in the long-run. (4) with the rise of average variable costs. (.....)
17. In a farm, the long-run decreasing returns to scale, could be a result of
(1) increasing prices of production factors. (2) spreading of the overhead cost.
(3) management problems. (4) replications of activities. (.....)
18. In terms of combining factors of production, the marginal rate of technical substitution
(1) is always positive.
(2) gives relative prices with output changes.
(3) relates to the ratio of marginal productivities and prices.
(4) measures input substitutability at constant output. (.....)
19. The long-term competitive equilibrium condition does **not** include
(1) $P = MC$. (2) $P = MR$. (3) $P = AVC$. (4) $P = LRATC$. (.....)

20. A production function is given as $Q = 20K^{0.6}L^{0.2}$. The returns to scale is
(1) 0.4. (2) 0.8. (3) 0.12. (4) 0.33. (.....)
21. The production function $Q = 10\sqrt{L}\sqrt{K}$ exhibits
(1) increasing returns to scale. (2) decreasing returns to scale.
(3) constant returns to scale. (4) variable returns to scale. (.....)
22. Which of the following is correct with respect to fixed cost (FC)?
(1) The AFC curves are usually U shaped.
(2) Because fixed costs are spread over, the marginal cost should decline continuously as the output increases.
(3) Not included in the average cost.
(4) None of the above is correct. (.....)
23. Which of the following is true with respect to the elasticity of substitution between two inputs, in a Cobb - Douglas production function?
(1) It is always equal to unity.
(2) It is always a constant.
(3) It can vary with the values of the coefficient.
(4) It approaches infinity when the summation of the parameters equals to unity. (.....)
24. Expansion path related to Cobb - Douglas production function
(1) is a straight line passes through the origin.
(2) is a quadratic function.
(3) is a rectangular hyperbola.
(4) depends on the parameters. (.....)
25. The 4 Ps found in marketing mix are
(1) product, price, perception and promotion. (2) price, place, people and preference.
(3) product, preference, place and promotion (4) product, price, place and promotion. (.....)
- Use the following information for questions No. 26 and 27.
* The demand (Q_d) and supply (Q_s) curves for a particular agricultural commodity are given below.
$$Q_d = 300 - P$$
$$Q_s = 0.5 P$$

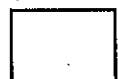
* P is in Rs and Q is in 1,000 kg
26. If the government imposes a quota of 80 ('000) on the production and sales the new equilibrium price will be (Rs)
(1) 200. (2) 220. (3) 180. (4) 160. (.....)
27. If the government sells its quota right, what would be the revenue (in thousand rupees)?
(1) 1,600. (2) 1,200. (3) 3,200. (4) 4,800. (.....)
28. The four major types of factors that affect the supply of land are
(1) natural and physical characteristics, economic, institutional and technological settings.
(2) economic, institutional, legal and social settings.
(3) institutional, legal, social and geographical settings.
(4) economic, physical, ecological and legal settings. (.....)



29. The two major groups of market risks are
- (1) biological and social.
 - (2) physical and social.
 - (3) physical and price.
 - (4) social and physical. (.....)
30. According to the Cob-web model for agricultural products, the process converges closer to the equilibrium level because
- (1) the supply curve is more steeper than the demand curve.
 - (2) the demand curve is more steeper than the supply curve.
 - (3) both the supply and demand curves adjust accordingly.
 - (4) producers analyze the past data and plan their supply. (.....)
31. Which of the following **cannot** be used to measure production functions?
- (1) Statistical analysis with time-series data.
 - (2) Statistical analysis with cross-sectional data.
 - (3) Computations based on technical information provided by farm manager.
 - (4) Compiling data based on technically efficient combination of inputs and outputs. (.....)
32. In a Cobb - Douglas production technology with K and L, the exponents of K and L were found as 0.84 and 0.24. If both K and L are increased by 1%, what would be the percentage increase of the output?
- (1) 0.60
 - (2) 0.98
 - (3) 1.08
 - (4) 2.01 (.....)
33. Which of the following is **not** a reason for market failure?
- (1) Presence of externalities.
 - (2) Difference between private and social costs.
 - (3) Nature of public goods.
 - (4) Inadequacy of well-defined property rights. (.....)
34. Which of the following is correct with respect to average cost (AC) and marginal cost (MC) curves?
- (1) AC must be equal MC at the output level where AC is the minimum.
 - (2) AC must be equal MC at the output level where MC is the minimum.
 - (3) AC and MC never intersect.
 - (4) AC and MC can intersect but not necessarily at a specific point. (.....)
35. Which of the following is **incorrect** regarding LRAC?
- (1) Shows the minimum cost per unit of producing each output level.
 - (2) Is a tangent to the short-run average cost curve (SRAC) at its minimum.
 - (3) For any specified output, TC and AC are the smallest in the long-run.
 - (4) The long-run total cost could be easily derived. (.....)
36. The expansion path is a straight line through the origin in
- (1) linear production functions.
 - (2) quadratic production functions.
 - (3) Cobb - Douglas production functions.
 - (4) translog production functions. (.....)
37. Which of the following is **not** an effective way to make small holder farmers more productive and sustainable?
- (1) make product markets work better.
 - (2) enhance the performance of product organizations.
 - (3) reduce the urban poverty.
 - (4) promote innovations through science and technology. (.....)



38. Which of the following approaches is **not** used in analyzing agricultural market?
(1) Functional approach. (2) Institutional approach.
(3) Legal approach. (4) Behavioural systems approach (.....)
39. The paddy land act was enacted in
(1) 1948. (2) 1957. (3) 1958. (4) 1972. (.....)
40. Which of the following is **not** necessarily a characteristic of agricultural markets?
(1) Market orientation (2) Inconsistency in supply
(3) Inconsistency in quality (4) Low value addition (.....)
41. In a market cost computation, it was found that shares of the producer, wholeseller and retailer as 43%, 34% and 23%, respectively. The marketing margin is
(1) 23%. (2) 43%. (3) 57%. (4) 77%. (.....)
42. Which of the following statements is true with respect to inferior goods?
(1) An increase in price might lead to an increase in the quantity demanded.
(2) An increase in price might lead to a decrease in the quantity demanded.
(3) A change in price has no effect on the quantity demanded.
(4) Cannot comment, as the demand income relationship is still unknown. (.....)
43. In agricultural marketing S-C-P stands for
(1) Seller - Consumer - Product. (2) Structure - Conduct - Performance.
(3) Seller - Consumer - Performance. (4) Seller - Consumer - Price. (.....)
44. In agricultural marketing, SCM stands for
(1) Structure, conduct and market. (2) Supplier, consumer and market.
(3) Supply chain management. (4) Supply chain market. (.....)
45. The percentage of contribution of agriculture to the GDP and the percentage of people employed in agriculture in Sri Lanka in 2010 are, respectively
(1) 10.5% and 53%. (2) 20% and 60%. (3) 33% and 40%. (4) 12.8% and 33%. (.....)
46. Which of the following institutions collects the data of cultivation costs and compile reports?
(1) Hector Kobbekaduwa Agrarian Research and Training Institute
(2) Department of Agriculture
(3) Central Bank Sri Lanka
(4) Department of Census and Statistics (.....)
47. If the change of price of an input (such as land) will not alter the supply, then that price is called
(1) opportunity cost. (2) shadow price. (3) rent. (4) reserved price. (.....)
48. Which of the following is **not** a dimension of an agricultural market?
(1) Geographical coverage. (2) Volume of transaction.
(3) Degree of competition. (4) Marketing margin. (.....)
49. A farmer cooperative society is an example of
(1) Vertical integration. (2) Market integration.
(3) Horizontal integration. (4) Contract integration. (.....)
50. Which of the following is **not** a facilitating function of an agricultural market?
(1) Financial provision. (2) Market intelligence.
(3) Storage. (4) Risk bearing. (.....)



● For each question from No. 51 to 75 write the correct answer on the dotted line given below each question.

51. Nimal's demand curve for sausages is given as $Q = 1000 - 0.4 P$ where $P =$ Price (Rs) and $Q =$ amount (kg). If the price of one kilogramme of sausages is Rs. 500, what is Nimal's consumer surplus?

.....

52. What are the key features in a market economy?

.....
.....

53. What are the two types of efficiencies found in marketing?

.....
.....

54. Using indifference curves with two goods, illustrate substitution and income effects.

55. What are the three main functions of a market?

.....
.....
.....

56. A wholesaler purchases potatoes at Rs. 40 / kg from a farmer and sells to a retailer at Rs. 80/kg. The retailer sells to a consumer at Rs. 100 / kg. What is the marketing margin (%)?

.....
.....

57. Who are the different types of middlemen found in agricultural markets?

.....
.....

58. What are the different forms of government interventions to agricultural markets?

.....
.....

59. Name two government institutions that deal with agricultural marketing.

.....
.....

60. What are the **three** main government departments that are involved in land and land development?

.....
.....
.....

61. What are the important steps in land use planning?

.....
.....

62. What are the factors affecting the demand for agricultural lands in Sri Lanka?

.....
.....

63. What are the key objectives of the Paddy Land Act?

.....
.....

64. In farm decision making, list **three** important farm records together with their roles/usefulness.

.....
.....
.....

65. Giving examples, explain the difference between vertical integration and horizontal integration.

.....
.....
.....
.....
.....

66. What is the significance of land settlement and colonization programme in economic development in Sri Lanka?

.....
.....

67. List the objectives of the land reforms in Sri Lanka under the Land Reform Acts of 1972/1975.

.....
.....
.....
.....

68. Sketch the production possibilities frontiers (PPF) for the following situations.

- (i) Products are competitive
- (ii) Products are supplementary
- (iii) Products are complementary

● Use the following information to answer questions from No. 69 to 71.

$$\text{Total cost (TC)} = Q^3 - 21Q^2 + 333Q + 100$$

$$\text{Quantity demanded } Q = 100 - \frac{1}{3}P$$

where P = price

69. Write the mathematical expression for profit.

.....

70. Find the profit maximizing level of Q .

.....

71. What is the maximum profit?

.....

72. What are the basic differences between financial and economic analysis?

.....
.....
.....

73. Using a diagram with demand and supply curves, illustrate the consumer surplus and producer surplus.

74. What is comparative advantage?

.....
.....

75. What are the **four** main types of factors affecting the supply of land?

.....
.....
.....
.....

