

G.C.E. (A.L.) Support Seminar - 2014

Agricultural Science I

Two hours

Instructions:

- * Answer **all** the questions.
- * Instructions are given on the back of the answer sheet. Follow those carefully.
- * In each of the question **1 to 50**, pick one of the alternatives from (1), (2), (3), (4), (5) which is **correct or most appropriate** and **mark your response on the answer sheet with a cross (×)** on the number of the correct option in accordance with the instructions with the instructions given on the back of the answer sheet.

01. The plant quarantine centre in Sri Lanka is situated at
(1) Gannoruwa. (2) Matale. (3) Ambalantota.
(4) Udawalawa. (5) Katunayake.
02. The reservoirs built only under the Mahaweli development project are
(1) Polgolla, Galoya and Udawalawa.
(2) Rantambe, Bowatenna and Victoria.
(3) Victoria, Udawalawa and Lunigamvehera.
(4) Inginimitiya, Randenigala and Galoya.
(5) Udawalawa, Kotmale and Rantambe.
03. Three basic nutrients absorb from soil by plants are
(1) Carbon, Oxygen and Hydrogen.
(2) Nitrogen, Carbon and Oxygen.
(3) Phosphorous, Nitrogen and Potassium.
(4) Boron, Zink and Magnesium.
(5) Arsenic, Cadmium and Lead.
04. The correct examples for the natural propagating structure “tubers” are
(1) Hingurala and Potato. (2) Colocasia and Innala.
(3) Sweet potato and Buthsarana. (4) Potato and Buthsarana.
(5) Innala and Pottato.
05. What is the most important colour for the photosynthesis in the visible spectra ?
(1) Indigo (2) Blue (3) Green (4) Yellow (5) Purple
06. An example for protein supplement that can be used in livestock nutrition is
(1) rice polish. (2) Sorghum. (3) coconut poonac.
(4) yellow maize. (5) cod liver oil.
07. The per capita poultry meat consumption in Sri Lanka is approximately
(1) 1 kg. (2) 2 kg. (3) 3 kg. (4) 4 kg. (5) 5 kg.
08. The most suitable soil type for paddy cultivation in Sri Lanka is
(1) Reddish brown soil. (2) Alluvial soil. (3) Regosol soil.
(4) Red latasol soil. (5) Red yellow podsolic soil.
09. Additives are incorporated to improve the quality of food. An example for such additive is
(1) sweeteners. (2) salt. (3) yeast.
(4) vitamin. (5) starter culture.
10. Both breeds and strains are used in poultry production. A poultry strain used for meat production is
(1) RIR. (2) Indian Game. (3) Australope.
(4) Cochin. (5) Wencobb.

11. The main causal agent for the tick fever in cattle is a
(1) Protozoa. (2) Tick.
(3) Bacteria. (4) Amoeba.
(5) Nematode.
12. A character of an egg that is to be selected for incubation is
(1) the shape index of 55 – 65%. (2) weight between 60-65 g.
(3) storage period between 10-14 days. (4) a thick egg shell.
(5) presence of thin air sac.
13. A several statements about soil colloids are given below.
A - Majority of the colloids contain in a soil are inorganic.
B - There is no shape for organic colloids.
C - Organic colloids insoluble in water but soluble in diluted bases.
D - Cation exchange capacity of organic colloids are higher than that of inorganic colloids.
- The correct statements out of the above statements are
(1) A and B only. (2) A, B and C only. (3) A, B and D only.
(4) A, C and D only. (5) B, C and D only.

14. The most suitable crop for the “Floating cultutre” that is classified under soilless culture is
(1) potato. (2) bell pepper. (3) gotukola.
(4) leeks. (5) tomato.

15. Below shows few statements about Tetrasolium Chloride used for testing seed viability.
A - A red colour solution.
B - Acts only on live seeds and produce Formosan red.
C - Must store in transparent bottles.

Of the above statements, the most accurate is/are

- (1) A only. (2) B only. (3) A and B only.
(4) A and C only. (5) B and C only.
16. The order of micro propagation is
(1) obtain plant part → place in the nutrient medium → multiplication of shoots
→ rooting → acclimatization to the external environment.
(2) obtain plant part → multiplication of shoot → place in the nutrient medium
→ rooting → acclimatization to the external environment.
(3) multiplication of shoots → obtain plant part → place in the nutrient medium →
rooting → acclimatization to the external environment.
(4) multiplication of shoots → rooting → obtain plant part →
place in the nutrient medium → acclimatization to the external environment.
(5) multiplication of shoots → rooting → place in the nutrient medium →
obtain the plant part → acclimatization to the external environment.

17. The correct statement on “Budding” is
(1) in crown budding, the diameter of stock and scion should be similar.
(2) arch budding can be used for plant rehabilitation.
(3) stone budding requires a stock with the diameter of a pencil.
(4) a bark with a single bud is used as a scion in saddle budding.
(5) the budding area wrapped from top to bottom.

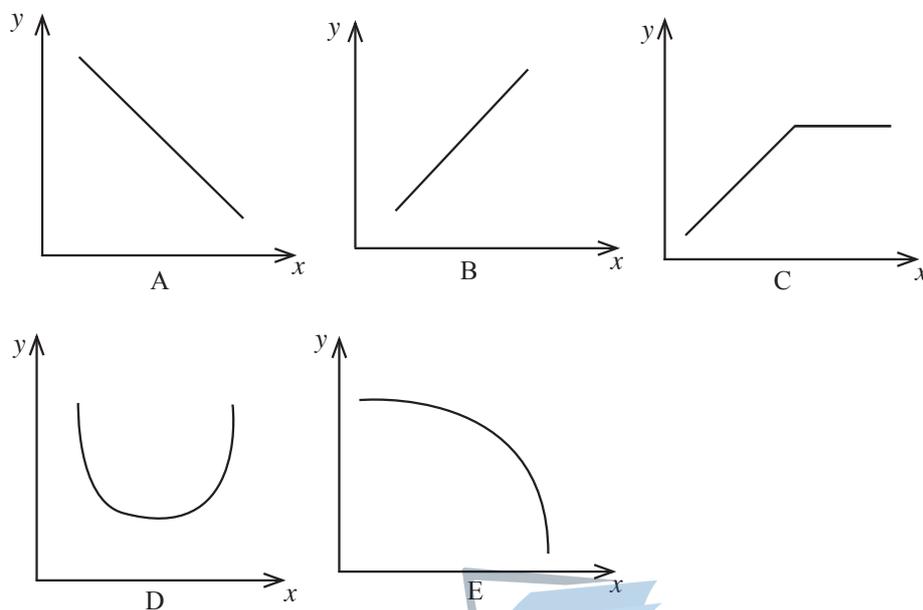
18. The staple food crop in Sri Lank belongs to the family
(1) Fabaceae. (2) Cruciferecae. (3) Palmaeae.
(4) Poaceae. (5) Solanaceae.

19. The major portion of the cattle population in Sri Lanka is distributed in
(1) up country. (2) mid country.
(3) low country wet zone. (4) dry Zone.
(5) coconut triangle.

20. Few statements about the digestion and absorption in fowl are given below.
A - Food is slightly digested in the crop by the amylase enzyme in saliva of fowl.
B - Lactase enzyme is not available in the digestive system of fowl.
C - Chemical digestion mainly happen in proventriculus and duodenum.
D - A slight microbial digestion takes place in the caecum.
- Of the above, most accurate statements are
- (1) A, B and C only. (2) A, B and D only. (3) A, C and D only.
(4) B, C and D only. (5) all A, B, C and D.
21. The true statement about broiler management is the
- (1) profit is high, when feed conversion ratio of broilers exceeds two.
(2) wastage can be minimized by providing the rations in mash form.
(3) over fattening of birds can be prevented by the restricted feeding of starter ration.
(4) contamination of broiler carcass can be prevented through starving the birds, 8 to 24 hours before slaughtering.
(5) litter should be changed time to time when the broilers are managed under the deep litter system.
22. Micro irrigation can be defined as
- (1) supplying of water through an open cannel under the gravity force.
(2) supplying of water through a perforated tube system buried in the soil sub surface zone.
(3) supplying of water under pressure through an above ground distribution head.
(4) supplying of micro volume of water to the soil through furrows.
(5) dividing the field into strips by ridges and supply water along the strips.
23. Following are some statements about ground water sources.
A - In common domestic wells, water is extracted from the artesian aquifers.
B - The opening of the artesian aquifers is located in the mountainous catchment areas.
C - Agro wells often receive water from artesian aquifers.
D - In artesian aquifers, water is stored between two impermeable rock layers.
- Of the above statements, most accurate are
- (1) A and B only. (2) B and C only. (3) B and D only.
(4) A, C and D only. (5) B, C and D only.
24. The correct statement about the action of plant hormone is
- (1) Cytokinine stimulate leaf senescence.
(2) Gibberalin stimulate dwarfness in plants.
(3) Absesic acid stimulate seed germination.
(4) Oxine stimulate lateral bud growth.
(5) Ethylene stimulate the flowering in pineapple.
25. The correct statement about the classification of agro ecological zone is
- (1) according to the new classification, there are 48 agro ecological zones.
(2) two upper case English letters are compulsory to indicate every agro ecological zone.
(3) the number appears in the agro ecological zone represent the rainfall distribution.
(4) the first English letter in the code represents the temperature.
(5) the highest number of Agro Ecological Zones are located in the dry Zonce.
26. An example for igneous rock is
- (1) Charnokite. (2) Dolomite. (3) Slate.
(4) Gnize. (5) Sandstone.
27. Following are few statements about water lifting devices.
A - Even mud and sand containing water can be pumped by centrifugal pumps.
B - A constant volume of water is discharged in every stroke in fixed displacement pumps.
C - A small motor is used to propel the water wheel.
D - "Yotta" is used to obtain water from small streams to irrigate the croplands.
- Of the above statements, the most accurate statements are
- (1) C and D only. (2) A, B and C only. (3) A, B and D only.
(4) A, C and D only. (5) B, C and D only.

28. An agricultural firm owns 4 ha land and plan to establish okra cultivation of 40 000 plants/ha. If seed mortality rate is 8%, the amount of seeds required for the firm is
(1) 12 800 (2) 43 200 (3) 43 478
(4) 172 800 (5) 173 913

• Question 29 and 30 are based on the following graphs



29. The relationship between soil air and soil water is represented in
(1) A. (2) B. (3) C. (4) D. (5) E.
30. The relationship between photosynthetic rate and light intensity is shown in
(1) A. (2) B. (3) C. (4) D. (5) E.
31. Two elements found in gypsum are
(1) Calcium and Magnesium.
(2) Sodium and Sulfur.
(3) Carbon and Calcium.
(4) Carbon and Magnesium.
(5) Calcium and Sulfur.

32. A farmer who examine the texture of the soil of his crop land through the roll method observed the following observations.

Nature of the rod



Nature of the ring



The crop that he can recommend for this land is

- (1) coconut. (2) paddy. (3) papaw.
(4) banana. (5) potato.
33. Few statements about fertilizer use efficiency is given below.
A - The short duration crops with fine and short roots possesses a high fertilizer use efficiency.
B - A soil at field capacity shows the highest fertilizer use efficiency.
C - The application of nitrate type fertilizer to the ill drained soil increase the fertilizer use efficiency.
Of the above, the most accurate statement/s is/are
(1) A only. (2) B only. (3) C only.
(4) A and B only. (5) B and C only.

34. Some statements regarding the establishment of rain gauge within a meteorological station are shown below.
- A - Specially made cement or concrete must be established on a flat form.
 - B - The opening of the rain gauge should be placed 30 cm above the ground level.
 - C - Should be placed 5 m away from the evaporating pan.
 - D - Should be established as far as three times height of the exterior obstacles.
- The correct statements out of the above are
- (1) A and B only.
 - (2) A, B and C only.
 - (3) A, B and D only.
 - (4) A, C and D only.
 - (5) B, C and D only.
35. The most common in essential food items is
- (1) completely inelastic demand.
 - (2) inelastic demand.
 - (3) unielastic demand.
 - (4) an elastic demand.
 - (5) completely elastic demand.
36. A characteristic that can be observed in oligopolistis market is
- (1) all goods and services are homogeneous.
 - (2) presence of lot of producers and consumers in the market.
 - (3) try to increase the sales through sales promotion methods but not compete with the price.
 - (4) no interaction between the suppliers.
 - (5) no unimpeded entrance.
37. A factor responsible for the shift of supply cure to the right would be
- (1) the tumor of production technique.
 - (2) an uncertainty in the industry.
 - (3) the reduction of the prices of production factors.
 - (4) the increase in the taxes on the raw materials.
 - (5) the reduction in concessions.
38. An example for a soilless nursery type used only in paddy cultivation is
- (1) submerged nursery.
 - (2) Noridoko nursery.
 - (3) compact nursery.
 - (4) Dapog nursery.
 - (5) mud nursery.
- **Following are few agrochemicals. The questions from 39 to 41 are based on them**
- A - Methyl Euginol
 - B - Metaldihyde
 - C - Pyrethrin
 - D - Cabofuran
 - E - Malathion
39. The chemical that can be used as bait for snail is
- (1) A.
 - (2) B.
 - (3) C.
 - (4) D.
 - (5) E.
40. A natural pesticide found in plants is
- (1) A.
 - (2) B.
 - (3) C.
 - (4) D.
 - (5) E.
41. An insecticide found in granular form is
- (1) A.
 - (2) B.
 - (3) C.
 - (4) D.
 - (5) E.
42. The correct statement about the digestive system of fowl is
- (1) teethes and salivary glands are found in the mouth.
 - (2) though the beak is found in fowl, no tongue is available.
 - (3) gizzard is located between crop and the proventriculus.
 - (4) cloacal opening is a common chamber for the openings of excretory and reproductive systems.
 - (5) large intestine is a comparatively wide, short structure and ends in rectum.
43. The weight and the height of a 15 years old girl is 45 kg and 1.5 m, respectively. Her body mass index (BMI) is
- (1) 03.
 - (2) 20.
 - (3) 22.5.
 - (4) 30.
 - (5) 68.

44. In a certain plant species, the tallness is represented by “T” and dwarf character is represented by “t”. T is prominent. If a tall heterogeneous plant is crossed with a short plant, the tall:short ratio found in the progeny is
(1) 1:1. (2) 2:1. (3) 3:1. (4) 3:2. (5) 9:7.
45. The insects in a certain order show complete metamorphism, contains two pairs of wings but act as a single pair of wings during flight and possess slender petiole in the abdomen. This order would be
(1) Lepidoptera. (2) Coleoptera. (3) Diptera.
(4) Orthoptera. (5) Hymenoptera.
46. The following are few statements about the adaptations in plants for their survival.
A - Ability to hibernate during adverse periods.
B - Long life cycle.
C - Production of large number of seeds in a year.
D - Efficient dispersal method.
Out of the above, most accurate are
(1) B and C only. (2) C and D only. (3) A,B and C only.
(4) A,C and D only. (5) B,C and D only.
47. In a certain soil, the basic cation content is 15 cmol/kg and the base saturation percentage is 75%. The amount of acidic cation in this soil is
(1) 5 cmol/kg. (2) 20 cmol/kg. (3) 35 cmol/kg. (4) 60 cmol/kg. (5) 90 cmol/kg.
48. A consequence in the parboiling of rice is
(1) difficulty in dehusking.
(2) increasing the breaking percentage of seeds.
(3) destroy lipase enzyme.
(4) softness in cooked rice.
(5) removal of nutrients like proteins and minerals.
49. The correct statement on the protected houses is
(1) as algae deposit on the polythene, it must be removed in every two years.
(2) by using the insect proof nets, the temperature inside the house can be reduced.
(3) the basic objective of net houses is to control the relative humidity.
(4) green houses are widely used for cut flower industry in Sri Lanka.
(5) pest control can be very effectively done by cultivating the crops in lath houses.
50. Some statements about traditional Chena cultivation are given below.
A - Organic fertilizer is used for Chena cultivation.
B - A cropping method that use only the rain water.
C - Preparation of Chena starts in October.
D - A mixed cropping pattern is used in Chena cultivation.
Of the above statements most accurate are
(1) A and B only. (2) B and D only. (3) A,B and C only .
(4) A,C and D only. (5) B,C and D only.

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Agricultural Science II

Three hours

A Part - Structured Essay

*Answer all the questions on this paper itself
(Each question carries 10 marks)*

01. A. Selected three instruments/structures established in an agricultural meteorological station are shown below. Use the following figures to answer the questions (i) and (ii).



A



B



C

- (i) Name the above diagrams indicated as A, B and C.

A

B

C

- (ii) What is the importance of establishing “C” structure in an agricultural meteorology station?

.....

.....

- (iii) Mention an instrument which is essentially needs to be placed in an agricultural meteorology station, but not essential to be used for reporting the daily weather parameters.

.....

- (iv) If the amount of water gathered in a rain gauge of 7 cm diameter is 770 cm^3 from a rain received for an area, what is the amount rainfall ?

.....

.....

.....

.....

B. An agriculture teacher gave his students an open ended cylinder which had the volume and weight of 125 cm^3 and 100 g respectively. The teacher instructed to obtain a soil sample from the crop field. Then he gave to them the opportunity to examine the sample.

(i) A student observed the above soil sample and mentioned the colour as reddish brown.

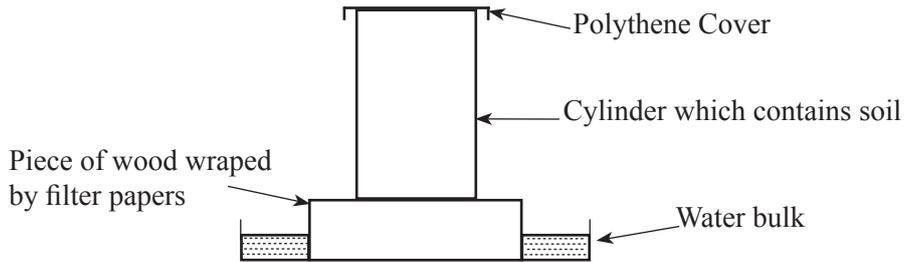
a. What would be the reason for the reddish brown colour of this soil sample?

.....

b. How can we exactly determine the colour of the soil sample?

.....

Collected soil sample was left for three days as follows.



Then, according to the instructions of the teacher, students had obtained following data.

The weight of saturated soil sample with water after 3 days = 400 g
The weight of soil sample after drying in an oven = 300 g

(ii) What is the purpose using a polythene cover in the above structure?

.....

(iii) Calculate the moisture content of the soil sample when it is in the field capacity.

.....

.....

(iv) Calculate the bulk density of the above soil sample.

.....

.....

.....

(v) What is the porosity of the above soil, if the true density was 2.4 g/cm^3 ?

.....

.....

.....

(C) Seed dormancy is a problem faced by the farmers when producing seeds by themselves.

(i) What is "seed dormancy"?

.....

.....

(ii) State the **two** forms of seed dormancy.

a. b.

(iii) Mention a possible treatment that can be used to overcome the seed dormancy of following seeds.

- a. Tomato -
- b. Winged beans -

(D) **Bg 360** is a kind of high quality white Samba which is known as “Keeri Samba”.

(i) State the name of the breeding station which produces this rice variety.

.....

(ii) State the duration of the above rice variety.

.....

(iii) State the time periods for the following growth stages of the rice plant.

Time period (Days)

- a. Reproductive stage
- b. Mature stage

(iv) The mature leaves of a rice plantation of three weeks of age were yellowish and whole field appeared light green compared to the neighboring rice fields. It is observed that the number of tillers per rice plant was also reduced.

a. Which nutrient deficiency would cause the above symptoms?

.....

b. Mention a kind of chemical fertilizer that can be used to overcome the above deficiency.

.....

c. Name a kind of fern that can be cultivated as a bio-fertilizer in the rice fields.

.....

(v) In a particular rice field, the rice plants which were grown under a lamp post has taken a long time for flowering while the plants grown under the shadow of the post has flowered earlier. Write the reason for this situation.

.....

02. (A) It has been reported that the groundwater sources in a particular area has been polluted due to the chemical effluents of a factory.

(i) Mention **two** characteristics required for drinking water.

- a.
- b.

(ii) Mention the way of accumulating chemical effluents to the ground water.

.....

(iii) The pH value of the drinking water of that area was said to be 4.

a. What do you mean by pH Value?

.....

.....

.....

b. Mention a more accurate method to determine the pH value of water.

.....

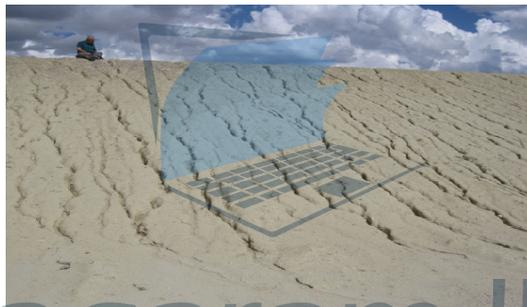
(B) Mention the idea reflects by the following terms.

- a. Infiltration
- b. Percolation
- c. Leaching
- d. Runoff

(C) C. Mention the main uses of following instruments.

- a. Trier and probe
- b. Auger
- c. Autoclave
- d. Burman funnel
- e. Lactometer

(D) D. A cultivated land of a farmer has been destroyed due to the heavy rains last for several days. An image of the destroyed land is shown below.



- (i) Mention the soil erosion form represents by the image.
.....
- (ii) Mention a method that can be used to rehabilitate the above field.
.....
- (iii) Mention **two** measures that can be used to avoid the soil erosion in his land again.
1.
2.
- (iv) State **two** problems arise in a cultivating land due to soil erosion.
1.
2.

(E) Following figure shows the action of applying herbicide to destroy weeds in a rice field by a farmer.



(i) Name the equipment used by the farmer to apply herbicide.

.....

(ii) He applies (a non selective herbicide / a selective herbicide) to his field.

(iii) Give an example each for a selective and non selective herbicide.

Non selective herbicide

Selective herbicide

(iv) The way of applying herbicide by the farmer cannot be recommended. Give one reason for that.

.....

03. (A) The following data were obtained from the experiment which was conducted to find the effect of Nitrogen fertilizer on paddy yield. Note that the price of 1kg of fertilizer is Rs. 80.00 and price of 1 kg of paddy is Rs. 40.00.

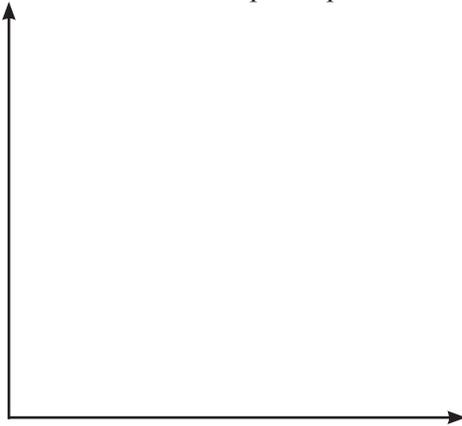
(i) Indicate the marginal production at each stage in the table.

(ii) Calculate the marginal revenue and complete the relevant column in the table.

(iii) Complete the marginal cost in the relevant column of the table.

Amount of Urea Applied (kg)	Production (kg)	Marginal productivity (MP)	Marginal revenue (MR)	Marginal Cost (MC)
0	0	.....	.....	.....
1	3	.....	.....	.....
2	8	.....	.....	.....
3	12	.....	.....	.....
4	15	.....	.....	.....
5	17	.....	.....	.....
6	16	.....	.....	.....
7	13	.....	.....	.....

(iv) Illustrate the relationship of inputs and outputs in the following graph.



(v) Define the diminishing marginal productivity theory.

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

(vi) Point out the optimum input stage.

.....

(B) In Sri Lanka, there are number of governmental, private and non governmental organizations to provide aid and instructions for the farmers and to disseminate the agricultural knowledge in Sri Lanka.

(i) Write **four** universities in Sri Lanka which have established agriculture faculties.

a b
c d

(ii) List **three** nongovernmental organizations which assist agricultural activities.

a
b
c

(iii) Write **two** challenges exists to improve the agriculture activities in Sri Lanka.

a
b

(C) A farmer in the Dry Zone wish to establish a sprinkler irrigation system for his chili cultivation which has the area of 1ha.

(i) Mention **two** factors that need to be considered when establishing a sprinkler irrigation system.

a
b

(ii) Mention **four** basic components of a sprinkler irrigation system.

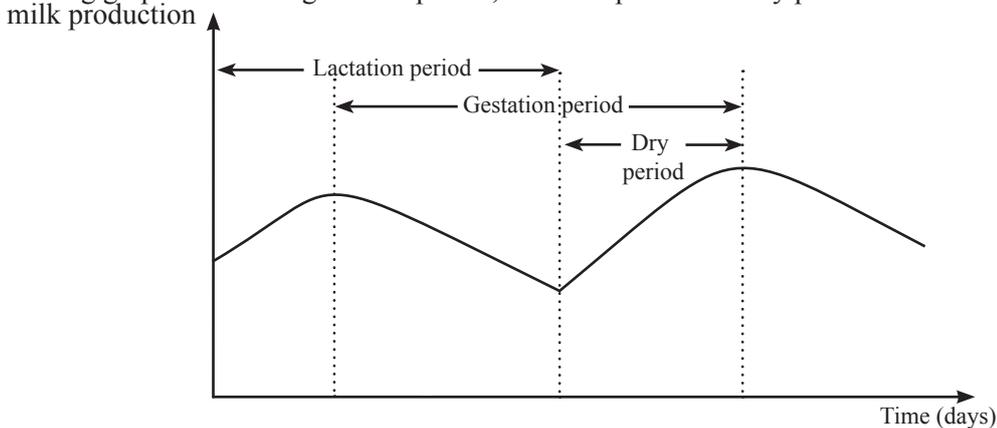
a
b
c
d

(iii) If a single sprinkler head irrigates 28m² area, calculate the space between the sprinkler heads

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

04. (A) It is essential to obtain a calf in every year to ensure continuous milk production and to extend the economic lifespan of a cow.

(i) Following graph shows the gestation period, lactation period and dry period of a cow.



a. What do you mean by the drying of a cow?

.....
.....

b. Mention length of the gestation, lactation and dry periods by days.

- 1. Gestation period
- 2. Lactation period
- 3. Dry period

c. Give **two** advantages of drying in cows.

- 1.
- 2.

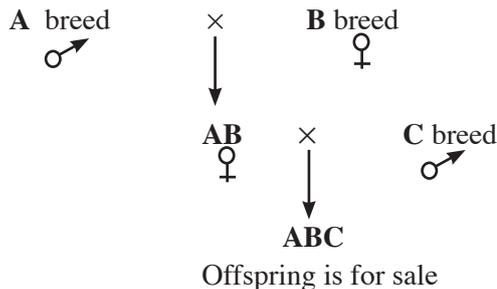
d. Name **two** measures to prevent mastitis among cows.

- 1.
- 2.

(ii) Name a high technical method that could be employed to obtain one calf per year.

.....

(B) A common breeding programme used in the livestock production is shown below.



(i) Mention this breeding method.

.....

(ii) What is the reason for using this breeding method in livestock production?

.....

(iii) List **two** types of farm record that can be used to get information about animals in the livestock breeding programme.

1.

2.

(C) Broiler chicken is an important source to fulfill the protein requirement in Sri Lanka.

(i) Mention a value added product that produced, using broiler chicken.

.....

(ii) Mention a chemical preservative that can be used to preserve the product you mentioned above.

.....

(iii) Mention a packing material that can be used to pack the product named above.

.....

(iv) Mention **two** facts that are essentially needs to be contained in the food packing label.

a

b

(D) Continuous feeding of high quality roughages to cattle, throughout the year is a major difficulty faced by the farmers. Production of hay and silage from the surplus roughages is a measure to overcome that problem.

(i) What do you mean by roughages?

.....

.....

(ii) Write the principle involve in the production of Hay.

.....

.....

(iii) Name **two** advantages of producing hay compared to silage production.

1.

2.

(iv) Write the compartment of the stomach of cattle in which roughage digestion is taking place.

.....

(v) Name **two** volatile fatty acids generate during the digestion of roughages.

1. 2.

**

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Agricultural Science II

Part B - Essay

- * Answer **four** questions only. Each question carries 15 marks.
- * Give clearly labelled diagrams where necessary.

5.
 - (i) Describe the recent steps taken by the government for the agricultural development .
 - (ii) “Mixed cropping gives economic as well as environmental benefits to the farmers”. Indicate the facts to support this statement.
 - (iii) Explain the impacts of changes in the environmental temperature created by the climate change on crop cultivation.
6.
 - (i) Explain the functions of soil bacteria.
 - (ii) Explain the benefits received by the customer and the business institute through the receipt of ISO standard certificate for a product.
 - (iii) Describe the procedure to be followed from the preparation of a raised nursery bed to the planting of seeds.
7.
 - (i) Although a farmer applied required nutrients at appropriate stages in suitable quantities, increment of yield was not observed. Describe the reason that might affect for this situation.
 - (ii) Describe the problems involve in agriculture marketing.
 - (iii) Mention the possible stages of post harvest losses in mango and describe the preventive measures for such losses.
8.
 - (i) Explain the rainfall mechanisms found in Sri Lanka.
 - (ii) Describe the environmental friendly measures to maintain the animal pests in a home garden below the economic threshold level.
 - (iii) Describe the correct agronomic practices for soil rehabilitation.
9.
 - (i) Describe the direct and indirect impacts of poor drainage conditions on crop growth.
 - (ii) Explain the hormonal effect on the functioning of the mammary system of a cow.
 - (iii) Classify the weedicides and explain the importance of the classification of weedicides.
10.
 - (i) Describe the procedures to be adopted to improve the irrigation efficiency in a crop land.
 - (ii) Describe the poultry rearing systems.
 - (iii) Describe the reasons for the loss of genetic resources in Sri Lanka and write the possible measures to protect the genetic resources.
