

AGRICULTURAL SCIENCE - HIGHER LEVEL

WEDNESDAY, 12 JUNE - AFTERNOON 2.00 TO 4.30

SIX QUESTIONS TO BE ANSWERED

1. Answer any six of the following:

- (a) Mention one use for the chemical Millon's reagent in the laboratory.
- (b) Give three reasons for the practice of crop rotation.
- (c) Use a labelled diagram to show the location of each of the following in a farm animal:-
Larynx, Trachea, Bronchus and Diaphragm.
- (d) Name one important animal parasite from each of the following Phyla:-
Platyhelminthes, Nematoda, Arthropoda.
- (e) Mention three reasons for the practice of thinning forest trees.
- (f) State two differences between plant and animal cells.
- (g) Describe, with the aid of a labelled diagram, the stages in the life cycle of the cabbage butterfly.
- (h) Mention the factors you would consider in deciding on the seeding rate for winter barley.
- (i) Explain, giving a named example, what is meant by biological control of a crop pest.
- (j) Mention a laboratory experiment which incorporates the use of both Pyrogallic acid and Sodium hydroxide.

(60 marks)

- 2.
- (a) Describe the conditions which contribute to the formation of a podzol.
 - (b) Explain how any three named environmental factors may contribute to the deterioration of the structure of a soil.
 - (c) Describe the ways in which nitrogen is supplied, used and re-cycled in a soil.

(48 marks)

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3. (a) Describe any management practices which are essential for optimum growth in a pasture sward.
- (b) Briefly explain the role of a named additive in the conservation of grass.
- (c) Describe any three factors which may influence the feeding of silage rather than hay to milch cows.

(48 marks)

OR

3. (a) Name any two distinct species of grass and, in each case, describe how their structure is adapted for survival in their own particular habitat.
- (b) Describe a laboratory method used for the extraction of chlorophyll from grass.
- (c) Draw a simple graph to illustrate how the cellulose content of a grass plant alters as it matures.

(48 marks)

4. (a) Describe the methods used to control the population of microorganisms in a milking unit on a farm.
- (b) Describe how bacteria present in a sample of milk may be grown in the laboratory for counting.
- (c) Name two ruminant animals and explain briefly the role of microorganisms in aiding digestion in a ruminant.

(48 marks)

5. (a) Compare and contrast temporary and permanent pastures under each of the following headings:
- (i) composition of the sward.
 - (ii) Suitability for conservation.
 - (iii) Grazing management.
- (b) What are the considerations necessary in planning the nutritional requirements and intake of farm animals?
- (c) Describe a laboratory investigation you carried out to detect the presence of a named nutrient in a farm foodstuff.

(48 marks)

6. In relation to a named farm animal enterprise with which you are familiar;-

- (a) describe the nature and extent of the production unit.
- (b) outline a strategy you would recommend for the following:-
 - (i) Management;
 - (ii) Feeding.

(48 marks)

7. (a) Name two forms of cell division and give examples of where each occurs in plants or in the animal body.
- (b) Explain each of the following:-
 - (i) Diploid number of chromosomes;
 - (ii) Gene mutation;
 - (iii) Cloning as practised by Plant Breeders;
 - (iv) Progeny testing.
- (c) The gene controlling yellow kernel colour in maize (YY) is dominant over its allele colourless kernel (yy).

Describe the phenotype and genotype expected in the kernels of seeds collected from a cross between a maize plant which is heterozygous for yellow kernel and one which is completely recessive for colourless kernel.

(48 marks)

8. Answer any two of the following:

- (a) Explain how a farmer should manage the internal environment of a housing unit to optimise the growth rate of pigs or sheep in an enterprise.
- (b) Outline a suitable breeding and replacement programme for a dry stock beef cattle enterprise with which you are familiar.
- (c) Describe the cultivation of a named farm crop, excluding grass, under each of the following heading:-
 - (i) Sowing rate;
 - (ii) Disease prevention and control;
 - (iii) Fertiliser treatment.

(48 marks)

9. Give a scientific explanation for any four of the following:-

- (a) Baling and storage of hay immediately after drying.
- (b) The process of podzolisation in a soil.
- (c) The protection of root crops during winter storage.
- (d) Using a systemic chemical in the control of Potato Blight.
- (e) The inclusion of Boron in some artificial fertilisers.

(48 marks)