
AGRICULTURAL SCIENCE - HIGHER LEVEL

WEDNESDAY, 18 JUNE - AFTERNOON 2.00 TO 4.30

SIX QUESTIONS TO BE ANSWERED

1. Answer any six of the following:

- (a) Name two reproductive hormones produced by farm animals.
- (b) Name one mineral element present in each of the following rock types:
(i) Limestone. (ii) Basalt.
- (c) Mention the products produced during the process of respiration in germinating cereal seeds.
- (d) Describe one identifying characteristic, during the inflorescence stage, of each of the following farm plants: (i) Clover, (ii) Perennial ryegrass, (iii) Meadow foxtail.
- (e) Mention three organs that are involved in the process of excretion in the animal body.
- (f) State the advantages of the presence of earthworms in a soil.
- (g) Describe three bodily characteristics that are important in the selection of breeding sows.
- (h) Distinguish between ingestion and digestion.
- (i) Describe briefly how fat is digested in the body of a monogastric animal.
- (j) Mention three housing requirements of a new born calf.

(60 marks)

2. (a) Explain how the pH value of soil in a field may be changed.
- (b) In the case of a named soil type describe the importance of each of the following:
watertable; capillarity; leaching; field capacity.
- (c) Describe the influence of each of the following on soil temperature:
aspect; colour; altitude; water content.

(48 marks)

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3. (a) Write notes on each of the following:
(i) Crop rotation
(ii) Combine drilling
(iii) Nutrient uptake by plants
- (b) Give reasons for a low rate of seedling establishment following sowing in early Spring.
- (c) Describe a laboratory or field investigation you carried out to determine the optimum sowing rate for a temporary lea.
- (48 marks)

OR

3. (a) Explain, giving relevant examples, why minerals and vitamins are an essential part of the diet of young animals.
- (b) Explain why it is necessary to control the level of fertiliser application, particularly under unsuitable weather conditions.
- (c) Explain why it is necessary to monitor and regulate the rate of feeding of concentrates to farm animals.
- (48 marks)

4. (a) Describe a laboratory method used to determine any two of the following;
(i) The percentage of sugar in a sugar beet plant.
(ii) The range of pigments in a grass plant.
(ii) The presence of protein in a named foodstuff.
- (b) Explain how bacterial activity may be controlled in the case of each of the following:
(i) After milking.
(ii) During ensiling of grass.
- (c) 'Micro-organisms are essential to the survival and growth of particular plant species'. Explain.
- (48 marks)

5. (a) Describe the management practices which contribute to a low level of ewe and lamb mortality.
- (b) Describe how synchronisation of oestrus is carried out in a sheep breeding enterprise. Briefly describe the advantages of synchronisation.
- (c) Outline the factors which contribute to an increased growth rate in animals in a mixed grazing enterprise.
- (48 marks)

6. (a) Discuss the rearing of either replacement heifers or beef cattle under each of the following headings:
- (i) Selection of suitable calves
 - (ii) Housing and feeding of weanlings
 - (iii) Mean liveweight gain over the two-year period from birth.
- (b) Describe the various grazing management methods which might be used in a beef cattle enterprise.
- (c) Explain how the fertiliser application programme varies for grassland which is cut, repeatedly, for silage.

(48 marks)

7. (a) Distinguish between Performance testing and Progeny testing.
- (b) Explain, using your knowledge of genetics and with the aid of a diagram, how F1 hybrids are produced by plant breeders.
- (c) Explain, using suitable examples, the concept of incomplete dominance and multiple alleles in genetics.
- (d) Outline a cross to explain the difference that occurs in the phenotype of the styles of maize plants which may be identified as being long, short or intermediate in length.

(48 marks)

8. Answer any two of the following:

- (a) Discuss the management principles and environmental conditions that are desirable in a successful pig rearing enterprise.
- (b) Describe the key factors which influence the growth and spread of a named fungus affecting a named farm crop. Draw a labelled diagram of the fungus you named.
- (c) Describe the cultivation of a named farm tillage crop under each of the following headings:
- (i) Place in rotation
 - (ii) Recommended varieties;
 - (iii) Method of cultivation.
 - (iv) Yield in tonnes per ha.

(48 marks)

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

- (i) The importance of pollination in seed production.
- (ii) The controlled spreading of farmyard slurry on grassland.
- (iii) A change in the composition of grass material over the growing season.
- (iv) The production of oxygen during photosynthesis.
- (v) A variation in the rate of transpiration of grass plants over the period of a warm summer day.
- (vi) The importance of Aphid control in the production of 'seed' potatoes.

(48 marks)