
AGRICULTURAL SCIENCE - HIGHER LEVEL

WEDNESDAY 17 JUNE - AFTERNOON 2.00 TO 4.30

SIX QUESTIONS TO BE ANSWERED

Question 1 Answer any six of the following:

- (a) State whether the cellulose in a grass plant is a protein or a carbohydrate and give a reason for your answer.
- (b) Mention the effects of leaching of an excessive amount of nitrogen into a stream.
- (c) Briefly explain why black spots may appear on the leaves of potato plants during the growing season.
- (d) Mention two functions of the rumen in a named farm animal.
- (e) Mention any two substances, other than water, present in silage effluent.
- (f) State the expected yield per hectare in the case of each of the following farm crops:
Barley, Oats, Potatoes and Sugar Beet.
- (g) Name one organism of agricultural importance classified in the Phylum Arthropoda.
- (h) Mention the location in the animal body of each of the following:
Incisor, Radius, Omasum, Caecum.
- (i) Mention four constituents of animal blood.
- (j) Mention any two functions of the liver.

(60 marks)

Question 2.

- (a) Describe any two factors which may influence two named physical characteristics of a soil.
- (b) Mention the principal factors which influence the formation of a loam soil.
- (c) Name two major and two minor elements occurring in a soil. Outline a laboratory or field experiment you carried out to show the influence of one major mineral element on plant growth.

(48 marks)

Question 3.

- (a) Write notes on each of the following:
- (i) Flushing in a sheep breeding enterprise.
 - (ii) Pollination and Fertilisation.
 - (iii) Flocculation.
- (b) "The feeding value of silage depends primarily on the quality of the grass ensiled". Explain.
- (c) In the case of a dairy enterprise, outline a winter feeding programme, which includes silage, suitable for each of the following:
- (i) Weanlings
 - (ii) One to two Year olds

(48 marks)

OR

Question 3.

- (a) Explain the importance of healthy leaves on a grass plant.
- (b) Describe the cultivation practices necessary to improve the quality of an old pasture sward.
- (c) Describe a laboratory investigation you carried out to show that a named atmospheric gas is necessary for the production of starch in leaves.

(48 marks)

Question 4.

- (a) Describe a suitable feeding programme for cows at calving.
- (b) Describe the relationship between feed intake, milk yield and body fat reserves of a dairy cow in early lactation.
- (c) Describe how good management influences the growth and development of individual animals in a beef herd.

(48 marks)

Question 5.

- (a) Describe the production of a named cereal crop under each of the following headings:
- (i) Fertility
 - (ii) Variety
 - (iii) Pre and Post harvesting stage.
- (b) Outline the principal practices involved in sugar beet or potato production following a lea.
- (c) Describe a laboratory test you carried out to estimate the content of sugar in sugar beet.

(48 marks)

Question 6.

- (a) Describe a system for inwintering of ewes under each of the following headings:
(i) Housing
(ii) Disease control.
- (b) Describe the feeding programme for a lamb from birth to weaning stage.
- (c) Mention the principal factors which contribute to a high mortality rate in a sheep-rearing enterprise.

(48 marks)

Question 7.

- (a) Explain, using suitable examples, why it is important to be able to distinguish between a homozygous and a heterozygous condition in breeding plants.
- (b) In maize, the gene for hairy tassel (HH) is dominant to the gene for hairless condition. The gene for full endosperm (EE) is dominant to the gene for shrivelled endosperm. If a cross is carried out between plants, heterozygous for both characters (tassel and endosperm) state the phenotype and genotype of the progeny expected from this cross.
- (c) Mention two alleles which are studied to demonstrate Mendel's Law of Independent Assortment.

(48 marks)

Question 8. Answer any two of the following:

- (a) Describe the environmental conditions and feeding practices involved in rearing bonhams from birth to weaning stage.
- (b) In relation to a beef enterprise, with which you are familiar, describe the management practices necessary to maximise the growth of weanlings, housed indoors, during the first winter.
- (c) Mention and explain how named biotic and soil factors may affect the growth of clover plants in a grassland sward.

(48 marks)

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

- (a) Maintaining a constant temperature in a pig farrowing unit.
- (b) Land drainage of marshy ground adjacent to a dairy or sheep farm enterprise.
- (c) A notable reduction in the size of tap roots growing during an extended drought period.
- (d) Feeding 'beastings' to a calf after birth.
- (e) A slow rate of plant growth on a gley soil.

(48 marks)