Coimisiún na Scrúduithe Stáit
State Examinations Commission

LEAVING CERTIFICATE EXAMINATION, 2004

AGRICULTURAL SCIENCE - HIGHER LEVEL

FRIDAY, 25th JUNE – MORNING 09.30 – 12.00

SIX QUESTIONS TO BE ANSWERED

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1. Answer **any six** of the following:

(a) (i) Identify the animal in photograph A.
(ii) State the phylum to which this animal belongs.
(iii) Write a note on the importance of any member of this phylum in agriculture.

(b) List **four** characteristics of a loam soil in comparison to a clay soil.

(c) Describe how a **named** plant pest could be controlled biologically.

(d) Name **three** notifiable diseases of farm animals in Ireland.

(e) (i) Identify the plant in photograph B.
(ii) State the family to which this plant belongs.
(iii) Describe the growth habit of this plant as shown in the photograph.

(f) (i) Identify the **two** crops in photographs C and D.
(ii) Distinguish between the two crops at the inflorescence stage of growth.

(g) State **three** differences between red clover and white clover.

(h) (i) State **one** factor that determines wool quality**.**
(ii) What is the approximate weight of a wool fleece?

(i) State **two** functions of the liver of a farm animal.

(j) Give **two** reasons why it is necessary to have strict controls in the application of pesticides to farm crops.

(60 marks)

2. (a) The following table shows the analysis of two soils A and B.

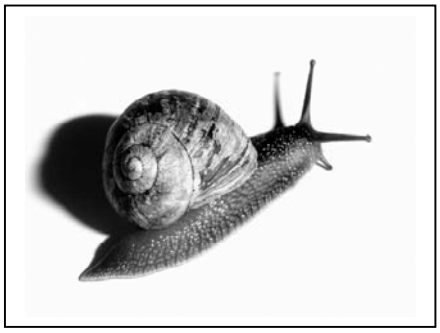
	Coarse Sand	Fine Sand	Silt	Clay
Soil A	46%	20%	20%	14%
Soil B	10%	17%	28%	45%

(i) Identify the texture of soil A and soil B.
(ii) Explain how these two soils differ under the headings of physical properties and chemical properties.

(b) Using a labelled diagram, describe any **named** soil profile.

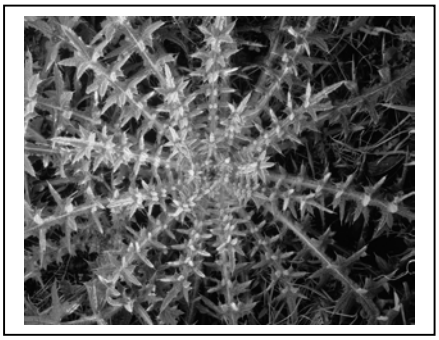
(c) Explain how soils are influenced during their formation by the following factors:
(i) Parent material
(ii) Climate
(iii) Topography
(iv) Living organisms.

(48 marks)



Georgette Douwma/Science Photo Library

A



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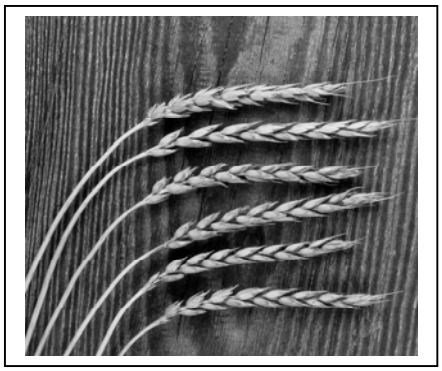
B



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C

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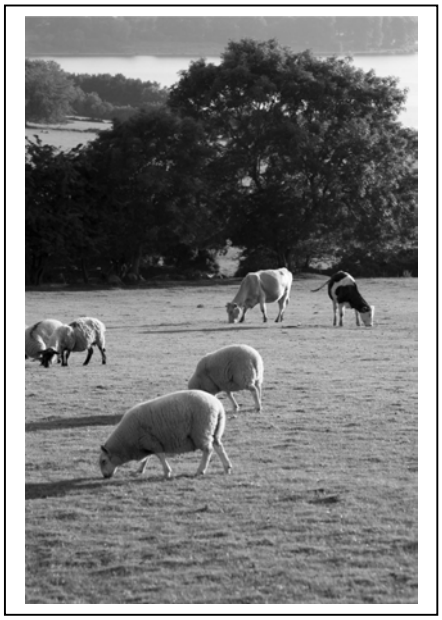
D



E

Option one

3. (a) Discuss the implications of the heavy use of nitrogenous fertilisers on pasture.

(b) Explain the role of the element nitrogen in the production of agricultural plants.

(c) Describe how you would obtain a culture of bacteria from the nodules on a root of a **named** legume.

(48 marks)

OR

Option two

3. (a) Write brief notes on each of the following:
(i) Condition-scoring of farm animals.
(ii) Importance of food conversion ratios in the rearing of farm animals.

(b) Compare the food requirements of a calf with that of an adult ruminant.

(c) Outline the farm practices carried out in the production of high quality milk in a dairy enterprise.

(48 marks)

4. Describe a laboratory or field method to show any **two** of the following:

(a) The presence of a **named** major element in a soil sample.

(b) An estimation of the protein content in a sample of silage.

(c) An estimation of the yield per hectare of a root crop prior to harvesting.

(d) The percentage of water and solids in a sample of milk.

(48 marks)

5. Recently your school has received a gift of ten hectares of very old and neglected pasture.

(a) (i) Describe a method that could be used to determine the botanical composition of this pasture.
(ii) List **four** plants commonly found in this type of pasture.

(b) Suggest a suitable seed mixture of at least **two** species that could be used to make this pasture more productive in the future. Give reasons for your choice.

(c) Describe **two** methods by which the seed mixture you have mentioned in (b) above could be introduced into the pasture without ploughing the area involved.

(48 marks)

6. (a) (i) Name the grazing system shown in photograph E.
(ii) Describe the advantages of this grazing system.

(b) Describe a beef suckler enterprise under the following headings:
(i) breeding programme (ii) feeding programme.

(c) Describe the characteristics used when selecting female breeding stock for a **named** farm animal.

(48 marks)

7. (a) Explain the following terms as used in genetics: haploid, sex linkage, incomplete dominance.

(b) In guinea pigs the genes for hair colour and length are located on non-homologous chromosomes. The allele for black (**B**) is dominant to the allele for brown (**b**) and the allele for short hair (**S**) is dominant to the allele for long hair (**s**). If two guinea pigs, both heterozygous for hair colour and length, were mated, state:
(i) the phenotypes that might appear in the offspring.
(ii) the ratio of these phenotypes.

(c) (i) Outline the significance of meiosis in reproduction.
(ii) What is meant by the term mutation? State **one** factor that can cause mutations.

(48 marks)

8. Answer **any two** from (a), (b), (c).

(a) (i) Describe the digestion of cellulose in a ruminant animal.
(ii) Distinguish between a maintenance ration and a production ration for dairy cows.

(b) Describe the main cultivation practices in the production of a **named** root crop. State the expected yield per hectare of your chosen crop.

(c) (i) Explain how a **named** fungus may affect the growth of a farm crop.
(ii) Explain how plant diseases can be prevented and controlled on a tillage farm.

(48 marks)

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

(a) The leader-follower system of grazing.

(b) The wilting of sugar beet tops before feeding them to livestock.

(c) The rolling or trampling of grass when making silage.

(d) The production of carbon dioxide in the animal body.

(e) The absorption of water by the root hairs of plants. **(48 marks)**

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