Coimisiún na Scrúduithe Stáit
State Examinations Commission

LEAVING CERTIFICATE EXAMINATION, 2003

AGRICULTURAL SCIENCE - HIGHER LEVEL

WEDNESDAY, 11 JUNE – AFTERNOON 2.00 – 4.30

SIX QUESTIONS TO BE ANSWERED

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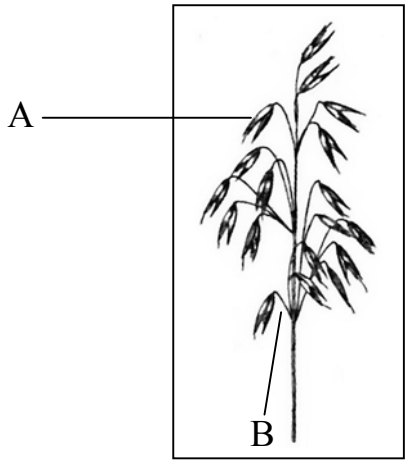
1. Answer **any six** of the following:

(a) Explain each of the following terms:
(1) Vaccination
(2) Symbiosis
(3) Tillering

(b) (1) What is anaerobic respiration?
(2) State **one** example where it occurs on the farm.

(c) Explain **three** characteristics of a loam soil that make it very suitable for tillage crops.

(d) The diagram is that of common oat (*Avena sativa*).



(1) To which plant family does oats belong?
(2) Name the parts labelled A and B.

(e) Seeds grow by <u>epigeal</u> or <u>hypogeal</u> germination.

(1) Explain the underlined terms.
(2) Give **one** example for each of the explained terms.

(f) Name **one** food constituent stored in each of the following animal tissues:

(1) Adipose tissue
(2) Bone
(3) Muscle

(g) Explain how the aspect of a field affects the temperature of a soil in early spring.

(h) Distinguish between a systemic and a contact fungicide.

(i) Explain the function of each of the following plant structures:

(1) Tendril
(2) Stolon
(3) Sorus

(j) State **two** differences between plant and animal cells.

(60 marks)

2. (a) Explain how flocculation contributes to the development of the structure within a soil.

(b) <u>Cementation</u> and <u>separation</u> are two processes that affect the development of soil structure.

(1) Explain the underlined terms.
(2) State and explain **four** factors that contribute to these two processes.

(c) Describe with the aid of labelled diagrams, an experiment to investigate the structure and texture of any named soil type.

(48 marks)

Option one

3. (a) Discuss the management of a sow (1) during late pregnancy and (2) after the birth of the bonhams.

(b) Describe how the feeding quality of grass changes as the grass matures.

(c) Write brief notes on each of the following:

(i) Importance of good body reserves in a cow at the time of calving
(ii) Catch crops on modern farms **(48 marks)**

OR

Option two

3. (a) Explain how (1) grass yield and (2) stocking rate influence production in a summer grazing beef system.

(b) Describe with the aid of labelled diagrams why a farmer would use rotational grazing instead of set-stocking in a beef rearing enterprise.

(c) Write brief notes on each of the following:

(1) The feeding programme of a lamb from birth to weaning
(2) Hygiene and disease control on the farm **(48 marks)**

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

(a) The presence of micro-organisms in an animal foodstuff

(b) How the activities of earthworms have an important role in the soil

(c) The productivity of an area of grassland

(d) The action of a named animal enzyme **(48 marks)**

5. (a) Explain the term **metabolism**.

(b) Describe **three** ways in which energy is lost from a farm animal.

(c) Distinguish, using named examples, between bulky foods and concentrates.

(d) Contrast (1) the structure and (2) the dietary requirements of a ruminant and a monogastric farm animal. **(48 marks)**

6. (a) Outline the main stages involved in producing a named cereal crop under the following headings:

(1) Soil type
(2) Seed bed preparation
(3) Sowing of the seed
(4) Use of fertilizer
(5) Harvesting of the crop

(b) Give a detailed explanation of the importance of:

(1) Crop rotation on a farm specialising in the production of tillage crops
(2) Using certified seed **(48 marks)**

7. (a) Red flower colour in sweet pea plants is a homozygous dominant condition (RR).
Pink flowering sweet pea plants were crossed with pink flowering sweet pea plants.
The seeds from these plants were collected and sown, and the new plants produced flowers as shown:

Number of plants with red flowers	27
Number of plants with pink flowers	56
Number of plants with white flowers	29

(i) State the genotype of the original pink flowering parents.
(ii) Explain how the three flower types shown above resulted from a cross between two pink flowered plants.
(iii) What offspring would result if a pink flowering sweet pea plant were crossed with a red flowering sweet pea plant? Describe this cross and state the genotype and phenotype of the offspring produced.
(iv) State **one** advantage for using plants in studies of genetics.

(b) Cells contain chromosomes.

(i) If an animal somatic cell has 22 pairs of chromosomes state
(1) the number of chromosomes found in a gamete
(2) whether the gamete is haploid, diploid or triploid

(ii) A female cow is homozygous for sex chromosomes (**XX**), and a male bull is heterozygous (**XY**) for sex chromosomes. Describe with the aid of a diagram the inheritance of sex chromosomes in cattle.

(48 marks)

8. Answer **any two** of the following:

(a) Explain the factors that influence the availability of phosphates in soils.
Distinguish between "total phosphates" and "available phosphates" in soils.

(b) Discuss, with the aid of a diagram, how the element nitrogen is recycled in nature.

(c) Explain each of the following:

(1) Performance testing of beef bulls
(2) Progeny testing of dairy cows
(3) The need for photosynthesis in plants **(48 marks)**

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

(a) The addition of molasses to grass during the making of silage.

(b) Conservation and retention of hedgerows on a farm.

(c) The absence of a flowering head on a sugar beet plant during its first season of growth.

(d) Potted plants losing turgidity on a very warm day.

(e) "Earthing up" around the potato. **(48 marks)**

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