Coimisiún na Scrúduithe Stáit
State Examinations Commission

LEAVING CERTIFICATE EXAMINATION, 2005

AGRICULTURAL SCIENCE - HIGHER LEVEL

FRIDAY, 24 JUNE – AFTERNOON 2.00 – 4.30

SIX QUESTIONS TO BE ANSWERED

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

(a) Explain why oxygen is necessary for germination.

(b) State **three** features of a grass flower that enable wind pollination to occur.

(c) Explain the term critical temperature in the context of the rearing of pigs.

(d) (i) Name the plant in photograph A.
(ii) Name the family to which it belongs.
(iii) State the expected yield per hectare of this crop.

(e) (i) Name the type of sedimentary rock that is prevalent in the Burren, County Clare.
(ii) Describe a chemical process that aids in weathering of this rock.
(iii) Name **one** feature of a soil formed from this type of rock.

(f) List the target weights for the efficient production of spring-born beef animals at the following stages of growth:
(i) at housing for the first winter,
(ii) at the start of grazing for the second summer,
(iii) at slaughter at 24 months.

(g) Speckled yellows is a disease of sugar beet caused by a deficiency of a trace element.
(i) Name the trace element involved.
(ii) Name another disease of sugar beet caused by a deficiency of a **named** trace element.

(h) State the specific function of each of the following in the animal body:
(i) Diaphragm,
(ii) Thyroid gland,
(iii) Hepatic portal vein.

(i) Give **two** reasons why most animals reared for beef in Ireland are steers (i.e. castrated males) and not bulls.

(j) Outline **three** functions of blood in the animal body.

(60 marks)

2. (a) Explain how each of the following farm operations could affect the population of earthworms in a tillage field:
(i) Soil cultivations,
(ii) Spreading farmyard manure.

(b) Give **three** differences between a soil developed under coniferous forest and a soil developed under grassland.

(c) (i) What is cation exchange?
(ii) Describe a laboratory experiment that would demonstrate the phenomenon of cation exchange in a soil.

(48 marks)

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A

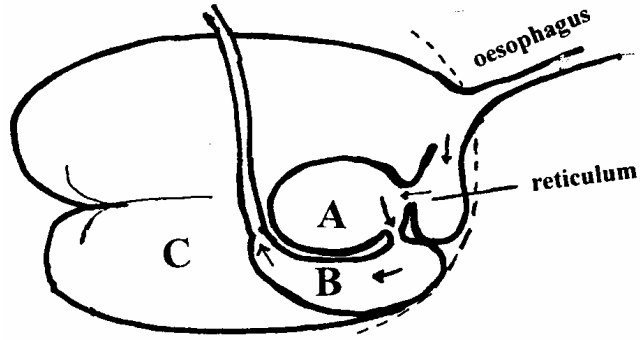
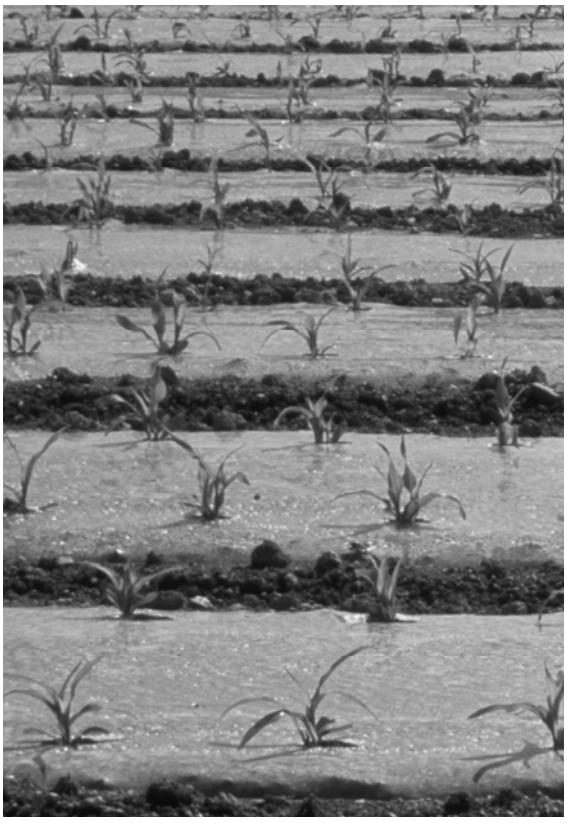


Diagram 1.



ALEX BARTEL/ SCIENCE PHOTO LIBRARY

B

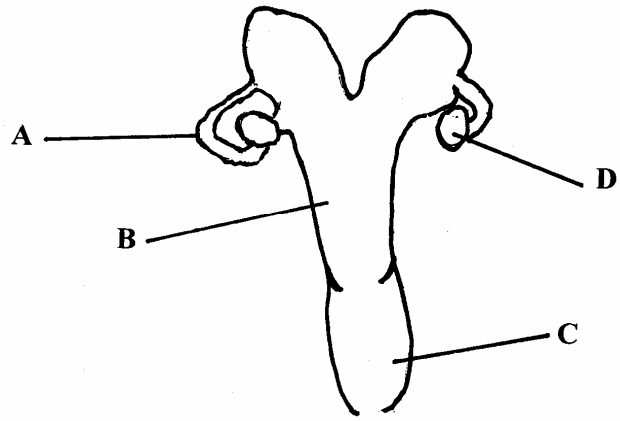


Diagram 2.

Option One

3. (a) (i) Outline how **two** factors have influenced the geographic location of tillage farming in Ireland.
(ii) Name **one** crop that could be grown using the method shown in photograph B.
(iii) State **two** advantages of using this method.

(b) Describe **two** non-chemical methods by which **each** of the following may be controlled in crop production:
(i) Weeds,
(ii) Pests.

(c) Suggest **four** reasons for using certified seed in the sowing of a cereal crop.

(48 marks)

OR

Option Two

3. (a) The diagram labelled **1** is of a ruminant stomach. The arrows indicate the movement of food.
(i) Identify the parts labelled A, B, C.
(ii) Describe briefly what happens to the food as it moves through the part labelled A.
(iii) Describe **three** functions of the part labelled C.

(b) Write notes on the condition called bloat in a ruminant animal.

(c) List **three** factors that determine the protein requirements of a farm animal.

(48 marks)

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

(a) The measurement of the total pore space within a soil.

(b) The bacterial quality of a sample of milk.

(c) The action of a named animal enzyme.

(d) The growth reaction of a plant shoot to an external stimulus. **(48 marks)**

5. The table below shows research data for first cut grass that was harvested at different dates.

Harvest date	**15 May**	**29 May**	**13 June**	**27 June**
Silage yield *(t DM/ha)*	4.0	5.2	6.6	7.8
Silage digestibility *(% DMD^2)*	75	70	65	60
Silage intake *(kg DM/day)*	9.0	8.3	7.6	7.0
Carcass gain *(kg/day)*	0.51	0.39	0.27	0.15

[Source: *Teagasc*]

(a) (i) Account for the increase in yield over time.
(ii) Explain the variation in digestibility of the various samples of first-cut silage.
(iii) Account for the decrease in the carcass gain per day.

(b) Explain the importance of each of the following in the preservation of grass as silage:
(i) Presence of sugars in the grass,
(ii) Absence of air during ensiling,
(iii) Use of additives,
(iv) Wilting the grass.

(c) Describe a method used to measure the percentage sugar in a sample of grass.

(48 marks)

6. (a) Write notes on the "leader – follower" grazing system when used in a calf to beef enterprise.

(b) Describe the management of bonhams **or** lambs from birth to weaning.

(c) Explain why cows usually lose body weight for a period of time after calving.

(48 marks)

7. (a) (i) Outline briefly the production of F1 hybrid seeds.
(ii) State **one** advantage of using F1 hybrid seeds.

(b) In sweet peas, a cross between a red-petalled plant and a white-petalled plant produces pink-petalled flowers in the progeny. Explain why this happens and show the cross using a diagram.

(c) Describe the micro-propagation of plants and give one advantage of this technique.

(48 marks)

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

(a) (i) State the recommended age and body weight of a dairy heifer at first mating.

(ii) Name the parts labelled A, B, C and D of the genital tract of a cow, as in diagram **2**.

(iii) Explain the breeding strategy used in a lowland sheep production system of your choice.

(b) Compare a sandy soil and a clay soil under the following headings; capillarity, fertility, texture.

(c) (i) Describe the fertiliser application programme for grassland which is cut twice during the growing season for silage.
(ii) Explain the contribution of clover to the fertility of the soil and to the feeding value of the herbage within a sward.
(iii) Describe the factors that influence the amount of fertiliser to apply to a tillage crop.

(48 marks)

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

(a) A high incidence of liver fluke in cattle grazing on poorly drained pasture.

(b) Teat dipping of cows after milking.

(c) The issuing of warnings to potato growers by the Irish Meteorological Service.

(d) A high incidence of leather jacket damage in a cereal crop following grass.

(e) The presence of dust-like particles in the air surrounding barley plants showing white raised patches on their leaves.

(48 marks)

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