



**Coimisiún na Scrúduithe Stáit  
State Examinations Commission**

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LEAVING CERTIFICATE EXAMINATION, 2007

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**AGRICULTURAL SCIENCE - HIGHER LEVEL**

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FRIDAY, 22 JUNE – AFTERNOON 2.00 – 4.30

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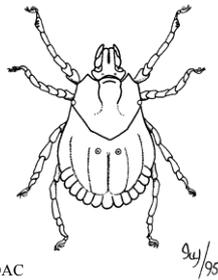
**SIX QUESTIONS TO BE ANSWERED**

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## SIX QUESTIONS TO BE ANSWERED

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

- (a) To measure how intensively a farm is being managed, the term livestock unit per hectare is used. Explain the term livestock unit and give an approximate value for the livestock unit per hectare for an intensively managed dairy farm.
- (b) Mention **three** features that distinguish the production of malting barley from feeding barley.
- (c) Name (i) a polysaccharide and (ii) a mineral element which form the main structural units of the cell wall of plants.
- (d) The diagram shows an ectoparasite of farm animals.
  - (i) Explain the underlined term.
  - (ii) Identify the ectoparasite shown.
  - (iii) To which phylum does this parasite belong?



- (e) Explain why colloidal humus particles are more beneficial than colloidal clay particles in a soil.
- (f) Explain the function of each of the following:
  - (i) masseter muscles,
  - (ii) saliva,
  - (iii) reticulum.
- (g) Write out the dental formula for an adult pig.
- (h) Give **two** reasons why the intake of fodder crops, (e.g. rape and kale) in the diet of a farm animal should be limited.
- (i) List **three** characteristics of a loam soil that would make it suitable for tillage.
- (j) Distinguish between the following:
  - (i) transpiration and translocation,
  - (ii) osmosis and active transport.

(60 marks)

- 2.
- (a)
    - (i) State **two** differences in composition between soil air and atmospheric air.
    - (ii) Explain how any **one** of the differences you have mentioned occurs.
  - (b) Describe an experiment which compares the movement of water by capillarity within two contrasting soils.
  - (c) Explain how each of the following influences the temperature of a soil:
    - (i) aspect,
    - (ii) colour,
    - (iii) water content,
    - (iv) location.

(48 marks)

### Option One

3. (a) The following table outlines the constituents of a ration that is fed as a supplement to hay or silage to a pregnant ewe.

Constituent	Percentage of Ration by Weight
Beet Pulp	40%
Rolled Barley	40%
Soya Bean Meal	20%
Mineral Mixture	

- (i) Give reasons, in each case, for the inclusion of the four constituents in the diet of a pregnant animal.
- (ii) What would be the consequences if the ration were to be composed of 40% soya bean meal and 20% rolled barley?
- (b) Advise a sheep farmer, concerning the feeding of the ration in the table above to pregnant ewes, under the following headings:
- (i) when to start feeding the ration,
- (ii) the daily feeding rates,
- (iii) the role of scanning ewes in determining the daily feeding rate,
- (iv) the consequences for the pregnancy if the above ration is not fed.
- (c) Explain **four** advantages of winter housing for pregnant ewes.

**(48 marks)**

**OR**

### Option Two

3. (a) In relation to a **named** root crop, describe the approaches a farmer might take to control weeds effectively.
- (b) (i) Describe the physiological changes occurring in a barley plant during the ripening process.  
(ii) Mention **two** tests a merchant might carry out when purchasing grain from a farmer.
- (c) Describe the production of a **named** catch crop on a tillage farm.

**(48 marks)**

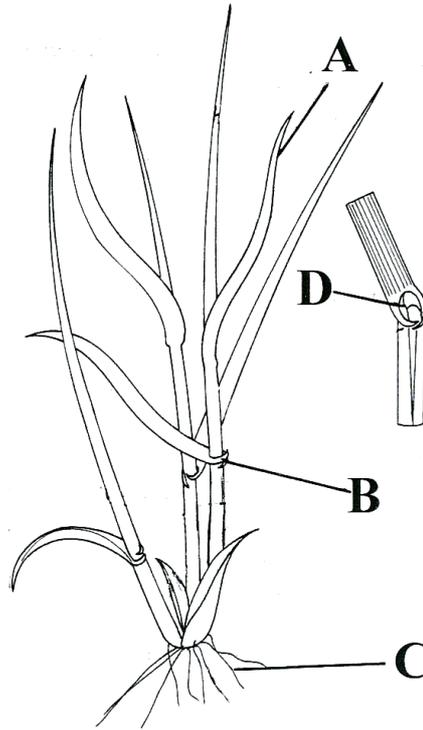
4. Describe a laboratory or field experiment in relation to any **two** of the following:

- (a) The effect of structure formation on total pore space in soils.
- (b) The determination of the percentage germination of a sample of seed.
- (c) The botanical composition of an old permanent pasture.
- (d) The determination of the digestibility of rolled grain as compared to whole grain.

**(48 marks)**

**[OVER**

5. (a) The diagram below is of a generalised grass plant. Name the parts labelled A B, C and D as shown on the diagram.



- (b) Discuss **two** advantages of including grass as a crop in an arable crop rotation.
- (c) Describe the characteristics of a grass plant at the ideal stage of growth for grazing.
- (d) Compare the feeding quality of silage (cut in May) and hay (cut in July).  
Give typical values to illustrate your answer.

**(48 marks)**

6. (a) Outline the precautions taken to reduce mortality at calving time in a dairy herd.
- (b) In a beef suckler system, describe the management practices necessary to achieve high levels of production.
- (c) The following table shows the effect of body condition score (BCS) at calving on milk production in early lactation.

Treatment	BCS	Milk Yield kg/cow/day	Milk Fat %	Milk Fat kg/cow/day	Milk Protein %	Milk Protein kg/cow/day
A	2.73	25.50	3.71	0.94	3.14	0.80
B	3.00	26.50	3.81	1.01	3.18	0.84

- (i) What is meant by a body condition score?
- (ii) What is the relationship between body condition score and milk yield in the data above?
- (iii) What is the total yield of fat plus protein under treatment A?
- (iv) State **two** factors, other than BCS, that may influence the percentage fat in milk.

**(48 marks)**

7. (a) Distinguish between each of the following:  
(i) inbreeding and crossbreeding,  
(ii) performance testing and progeny testing.
- (b) In peas, the allele for round seed (**R**) is dominant over the allele for wrinkled seed (**r**). Outline the cross between a heterozygous round-seeded plant and a wrinkled-seeded plant. In your answer show the gametes produced and the genotypes and phenotypes of the offspring.
- (c) Write brief notes on **three** of the following:  
(i) F1 hybrids,  
(ii) polyploidy,  
(iii) embryo transplantation,  
(iv) genetic modification.

(48 marks)

8. Answer **any two** of the following (a), (b), (c).

- (a) (i) Outline the role of microbes in the rumen of a farm animal.  
(ii) Describe the pathway taken by any **named** food nutrient within an animal's body following digestion.
- (b) (i) Describe a laboratory or field experiment to assess the effect of a **named** major mineral element on plant growth.  
(ii) State the role in the plant of the element you have named.
- (c) (i) Describe the factors that affect the composition of animal slurry.  
(ii) Explain **two** advantages of the spreading of organic manures on soils.  
(iii) Name **two** gases that may build up in stored slurry.  
(iv) State **one** precaution that should be taken when agitating slurry in a slatted house.

(48 marks)

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

- (a) High levels of leatherjackets in a crop following grass.
- (b) A change in the leaf area of plants growing near a hedgerow.
- (c) Feeding bought-in calves only water and glucose for the first 24 hours on arrival on a farm.
- (d) The variation in the dry matter content of potatoes.
- (e) The practice of housing a boar near sows and the double-serving of sows in a pig breeding enterprise.

(48 marks)

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