



**Coimisiún na Scrúduithe Stáit  
State Examinations Commission**

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**LEAVING CERTIFICATE EXAMINATION, 2012**

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**AGRICULTURAL SCIENCE - HIGHER LEVEL**

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**THURSDAY, 21 JUNE – MORNING, 9.30 – 12.00**

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Answer any **six** questions.  
Question 1 carries 60 marks.  
All other questions carry 48 marks each.  
Write all your answers in the answer book.

**Total marks: 300 marks.**

1. Answer any **six** of the parts (a) – (j).

- (a) (i) Name **one** monocot plant and **one** dicot plant.  
(ii) List **two** differences between monocot plants and dicot plants.
- (b) Give **three** characteristics of members of the class *Mammalia*.
- (c) (i) Mention **two** methods by which weed seeds are dispersed.  
(ii) For **each** method, name a common weed that uses this method of dispersal.
- (d) State the precise location **and** function of **each** of the following in the body of a farm animal.  
(i) Alveolus.  
(ii) Adipose tissue.  
(iii) Abomasum.
- (e) Roughage must be included in the diet of a calf.  
(i) Suggest a reason for including roughage.  
(ii) When is roughage introduced?  
(iii) Name a suitable food that could be used as roughage.
- (f) Explain the agricultural term *tramlines* **and** give **two** reasons for their use.
- (g) Compare limestone and granite as parent materials in soil formation.
- (h) In **each** of the following cases, name the type of cell division  
(i) that produces four daughter cells from one mother cell,  
(ii) that **always** produces haploid daughter cells,  
(iii) during which crossing over occurs.
- (i) State the function of **each** of the following plant tissues.  
(i) Xylem.  
(ii) Meristem.  
(iii) Palisade.
- (j) (i) Indicate the average *litter size* **and** the target number of *bonhams weaned per annum* for a sow.  
(ii) Suggest **two** ways by which the number of bonhams weaned per annum could be increased.

**(60 marks)**

2. (a) The National Ploughing Association of Ireland often holds its ploughing championships on brown earth soils.  
(i) Suggest **two** reasons why such soils are suited to tillage.  
(ii) Draw a large labelled diagram of a brown earth soil profile.
- (b) Explain how a **named** soil texture influences  
(i) pore spaces,  
(ii) water movement,  
(iii) fertility.
- (c) Describe a laboratory experiment to show the effect of phosphate deficiency in a plant.

**(48 marks)**

### 3. Option One

- (a) Using a table or a pie-chart, show the composition of cow's milk.
- (b)
  - (i) List **four** factors that can cause changes in milk composition.
  - (ii) Fully explain any **two** of the factors referred to above.
- (c) Contamination of milk is a problem in milk processing.
  - (i) List **three** contaminants of milk.
  - (ii) Describe an experiment to test the hygienic quality of milk.

**(48 marks)**

**OR**

### 3. Option Two

- (a) Discuss the role of *scanning* in sheep production.
- (b)
  - (i) Explain the term *terminal sire* as it applies in sheep breeding.
  - (ii) Suggest **two** breeds that could be used as terminal sires.
  - (iii) Give a reason for **each** of your choices in part (ii).
- (c) Compare *flushing* with *steaming-up* as feeding strategies in sheep production.

**(48 marks)**

### 4. In the case of any **two** of the following, describe a laboratory **or** field method:

- (a) To assess the quality of grass silage.
- (b) To prepare a sample of plant cells for examination under a microscope.
- (c) To show that carbon dioxide is necessary for photosynthesis.
- (d) To demonstrate cation exchange in a soil.

**(48 marks)**

**[OVER**

5. (a) Give **four** reasons why the area under **wheat** cultivation is much less than the area under **barley** cultivation in Ireland.
- (b) Give a reason for **each** of the following practices in potato cultivation.
- (i) Sprouting.
  - (ii) Burning-off the haulms.
  - (ii) Earthing-up.
  - (iv) Using certified seed.
- (c) Outline **four** reasons for losses occurring in potatoes during storage. (48 marks)
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6. (a) (i) Construct the typical growth curve graph for the two-year 'calf-to-beef' production system.
- (ii) On your graph show clearly:
1. Target weights at first winter housing **and** second winter housing.
  2. Where compensatory growth begins.
- (iii) Suggest a suitable diet for the beef cattle in the first **and** second winter.
- (b) Suggest a suitable mastitis-prevention programme in a spring-calving dairy herd.
- (c) Outline the role of any **one** hormone in milk production in a lactating cow. (48 marks)
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7. (a) Explain any **three** of the following terms:
- (i) Sex linkage.
  - (ii) Continuous variation.
  - (iii) Genetically modified (GM) crops.
  - (iv) Binary fission.
- (b) In cereal trials for oats, the pure-breeding variety Barra, with a straw length of approximately 500 mm, was crossed with the pure-breeding variety Evita, with a straw length of approximately 800 mm. The resulting hybrid had an approximate straw length of 650 mm.
- (i) Using B to represent the '500 mm' gene and E to represent the '800 mm' gene, show how this result arose.
  - (ii) Using a Punnett square or other suitable method, show the genotypes and **matching** phenotypes resulting from a cross between two of the new hybrids.
- (c) Describe **one** natural method of vegetative reproduction in plants.
- (d) Identify **two** reasons why male animals are castrated on farms. (48 marks)

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

- (a) Describe, with the aid of a labelled diagram, how the element nitrogen is recycled in nature.
- (b) “There will always be a role for hay in Irish farming.”
  - (i) Defend this statement.
  - (ii) Outline **three** principal steps in conserving grass as hay.
- (c) Highlight the main differences between the members of any **three** of the following pairs:
  - (i) Lungworm and ringworm.
  - (ii) Breeding unit and finishing unit.
  - (iii) Catch crop and nurse crop.
  - (iv) Zoonoses and zoospores.

**(48 marks)**

9. Give scientific explanations for any **four** of the following:

- (a) The importance of pollination in plants.
- (b) A greater demand for energy by animals kept outdoors over the winter.
- (c) The occurrence of bare patches of ground in a recently sown cereal crop.
- (d) The benefits arising from shelter-belts on exposed farms.
- (e) The locating of boars in dry sow houses.

**(48 marks)**

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