



# Coimisiún na Scrúduithe Stáit State Examinations Commission

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## LEAVING CERTIFICATE EXAMINATION, 2015

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### AGRICULTURAL SCIENCE – HIGHER LEVEL

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THURSDAY, 18 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.**

[OVER]

1. Answer any **six** of the parts (a) – (j).
- (a) Give **three** reasons for the practice of thinning forest trees.
  - (b) State to which phylum **each** of the following belongs:
    - (i) Earthworm.
    - (ii) Greenbottle fly.
    - (iii) Liver fluke.
    - (iv) Sheep.
    - (v) *Babesia*.
  - (c) Explain why it is necessary to have strict controls in the application of pesticides to farm crops.
  - (d) Mention any **three** factors that contribute to the formation of a gley soil.
  - (e) List **three** characteristics that are typical of the family *Gramineae*.
  - (f) List any **two** structural characteristics of **each** of the following:
    - (i) a fern plant.
    - (ii) a pine tree.
  - (g) Explain the importance of *critical temperature* in the context of a pig rearing enterprise.
  - (h)
    - (i) Explain the term *interdependence* as used in ecology.
    - (ii) Give **two** examples of interdependence in agriculture.
  - (i) Give **three** functions of blood in the animal body.
  - (j)
    - (i) Explain what is meant by the aspect of a field.
    - (ii) Outline how aspect affects crop growth.

**(60 marks)**

- 2.
- (a)
    - (i) Describe the conditions which contribute to the formation of a podzol soil.
    - (ii) Explain how soil temperature is influenced by soil texture.
    - (iii) Name **one** other characteristic of a soil that could affect its temperature.
  - (b)
    - (i)
      - 1. Explain the difference between a cation and a colloid.
      - 2. Explain the terms *cation exchange* **and** *cation exchange capacity (CEC)*.
    - (ii) How may the CEC of a soil be increased?
  - (c) Describe an experiment to investigate cation exchange in a soil.

**(48 marks)**

**3. Option One**

- (a) (i) Outline the advantages of sprouting seed potatoes.  
(ii) Seed potatoes are not true seeds. Discuss the validity of this statement.
- (b) Give an account of the potato blight fungus (*Phytophthora infestans*) under the following headings:  
(i) Lifecycle.  
(ii) Disease symptoms.  
(iii) Prevention and control measures.
- (c) (i) It is important to use certified seed potatoes in commercial growing because they are disease-free.  
Give **two** possible diseases of potato crops, other than blight, and the causative agent in **each** case.  
(ii) Explain why some regions of Ireland, e.g. Co. Donegal, are considered to be particularly suitable for the production of seed potatoes.

**(48 marks)**

**OR**

**3. Option Two**

- (a) Discuss in detail the following points in relation to a dairy enterprise:  
(i) Management of calving.  
(ii) Environmental conditions in the first three days after birth.  
(iii) Feeding principles in the first three days after birth.
- (b) Discuss in detail the rearing of dairy calves, from age three days to first housing, under the following headings:  
(i) Management.  
(ii) Feeding principles required for optimum growth.
- (c) (i) What is the expected liveweight of dairy calves at first housing?  
(ii) Explain why most beef animals are slaughtered at two years of age.

**(48 marks)**

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

- (a) To determine the percentage mineral ash in a sample of freshly cut grass.
- (b) To assess the effects of overgrazing on the botanical composition of a pasture sward.
- (c) To examine the effect on yield of growing different varieties of a named crop.
- (d) To show the presence of micro-organisms in an animal foodstuff.

**(48 marks)**

[OVER]

5. (a) (i) Sheep are polyoestrous. What does the term *polyoestrous* mean?  
(ii) What is the length of the oestrous cycle in sheep?  
(iii) Explain the connection between day length and the breeding season in sheep.
- (b) Draw a large labelled diagram of the reproductive system of a ewe and label **four** parts.
- (c) Describe the key steps involved in ‘breeding out of season’ to produce lambs for the early spring market.
- (d) Outline **four** reasons for culling ewes.
- (48 marks)**
6. (a) List **and** explain **four** factors a farmer should take into consideration when deciding how much fertiliser to apply to a crop.
- (b) Other than fertilisers, list **and** explain **four** additional factors that would influence the yield of a crop at harvest.
- (c) (i) What is meant by the term *transpiration*?  
(ii) Describe how any **three** environmental factors affect the rate of transpiration in a plant.
- (48 marks)**
7. (a) (i) State the Law of Independent Assortment.  
(ii) Explain the following terms:  
1. Sex linkage.  
2. Clone.  
3. Polyploid.
- (b) In cattle, the allele for red coat (R) is dominant to the allele for black coat (r) and the allele for straight coat (S) is dominant to the allele for curly coat (s). If a bull with a red straight coat is mated with a cow with a black curly coat, the resulting calf has an equal chance of showing one of four phenotypes.
- (i) State the genotypes of the bull and cow using the above notation.  
(ii) State the four possible calf phenotypes.  
(iii) Which of the possible phenotypes indicate that independent assortment has taken place?
- (c) The abolition of milk quotas will give many dairy farmers scope to increase milk production for the first time in more than thirty years.  
Discuss the advantages of using sexed semen rather than conventional semen to those dairy farmers planning to increase milk production.
- (48 marks)**

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

- (a) Describe with the aid of a diagram the processes involved in the nitrogen cycle.
- (b) (i) Outline the principal practices required for good grassland management.  
(ii) Give **two** benefits of mixed grazing.  
(iii) 1. What is meant by the term *livestock units*?  
2. Give **two** examples to show your understanding of the term *livestock units*.
- (c) Distinguish between the members of any **three** of the following pairs of terms:  
(i) *Top dressing* and *topping*.  
(ii) *Hepatic vein* and *hepatic portal vein*.  
(iii) *Raised bog* and *blanket bog*.  
(iv) *Tilling* and *tiller*.

**(48 marks)**

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

- (a) The formation of rancid silage.  
(b) Spreading slurry at least seven weeks before cutting grass for silage.  
(c) Retention and conservation of hedgerows on a farm.  
(d) The testing of milk by dairies.  
(e) Using a burdizzo in beef rearing enterprises.

**(48 marks)**

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