



**Coimisiún na Scrúduithe Stáit
State Examinations Commission**

LEAVING CERTIFICATE EXAMINATION, 2006

AGRICULTURAL SCIENCE - HIGHER LEVEL

FRIDAY, 23 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 most soils in Ireland are regarded as “young” soils in geological terms.
- (b) State **three** reasons why texture is an important soil property.
- (c) Give **two** examples of the use of hormones in the control of growth characteristics of plants.
- (d) Give **one** example, in each case, of a plant that reproduces using one of the following:
 - (i) Runners
 - (ii) Rhizomes
 - (iii) Tubers
 - (iv) Bulbs.
- (e) Name a plant or animal parasite, belonging to the Phylum Nematoda, and describe its life-cycle.
- (f)
 - (i) Name the organ that produces bile in the body.
 - (ii) Where is bile stored?
 - (iii) State a function of bile.
- (g) Explain **one** use of each of the following in the context of the feeding of farm animals:
 - (i) Molasses
 - (ii) Beet tops
 - (iii) Kale.
- (h) Give an example of one plant from each of the following families:
 - (i) Cruciferae
 - (ii) Leguminosae
 - (iii) Compositae
 - (iv) Umbelliferae.
- (i) Answer the following in the context of sheep:
 - (i) What is the approximate weight (in kg) of a lamb at birth?
 - (ii) What is the length (in days) of the oestrous cycle of a ewe?
 - (iii) What is the gestation period (in months) of a ewe?
- (j) Most of the bacon pigs produced in Ireland are reared in integrated pig production units. Explain the underlined term and give **two** advantages of these units.

(60 marks)

- 2.
- (a) Explain why regular liming of land is an important farming operation in Ireland.
 - (b) List the main steps in the podzolisation of a soil.
 - (c) Outline the chemical exchanges that would occur in the soil between the lime, soil colloids and soil solution following the application of lime.
 - (d) Describe the influence of earthworm activity on the structure and development of a soil.

(48 marks)

Option One

3. (a) The photograph below shows a dung beetle.
- (i) Name the phylum to which dung beetles belong.
 - (ii) Describe **two** benefits from the activities of dung beetles.
 - (iii) State **two** advantages of adding farmyard manure to a soil.



- (b)
 - (i) State **one** function of nitrogen in plants.
 - (ii) Describe in detail any **two** steps in the nitrogen cycle.
 - (c) Describe how each of the following factors influences the production of a grazed sward:
 - (i) Soil type
 - (ii) Management practices
 - (iii) Season.
- (48 marks)**

OR

Option Two

3. (a)
 - (i) Name **two** viral diseases of potatoes.
 - (ii) In the case of **one** disease state how it is spread.
 - (iii) Mention **one** method used to prevent the spread of this disease.
 - (iv) Give **two** examples that show the beneficial effects of bacteria in farming.
- (b) Describe the life cycle of a **named** parasitic fungus, which causes a disease in a crop, under the following headings:
 - (i) Mode of reproduction.
 - (ii) Mode of nutrition.
 - (iii) Environmental conditions that favour the spread of the disease.
- (c)
 - (i) Name **two** examples of “production diseases” which occur in farm animals.
 - (ii) In the case of **one** of the diseases you have mentioned, state the cause, the main symptoms and a method of prevention or cure.
- (48 marks)**
4. Describe a laboratory or field method to show any **two** of the following:
- (a) The presence of a **named** mineral nutrient in a soil sample.
 - (b) The extraction of pigments from a sample of grass.
 - (c) The presence of protein in a sample of peas.
 - (d) The production of heat during the germination of seeds.
- (48 marks)**

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5. (a) Explain why the botanical composition of a permanent ley differs from that of a temporary ley.
- (b) Discuss **two** advantages of including grass as a crop in an arable crop rotation.
- (c) Give **three** reasons for the inclusion of cereals as a supplementary food for farm animals.
- (d) In relation to fodder crops, other than grass:
- State **three** advantages of growing fodder crops.
 - Describe **two** methods used in feeding these crops to animals.
- (48 marks)**
6. (a) (i) Identify **three** characteristics which could be used to determine the merit of an individual species of grass in agriculture.
- (ii) Describe an experiment that could be used to determine one of the characteristics mentioned in part (i).
- (b) Explain the following in relation to a dairy cow:
- Length of lactation period
 - Lactation curve
 - The relationship between lactation peak and total lactation yield
 - The management of feeding in a spring-calving dairy herd to ensure the potential lactation peak is achieved.
- (c) Suckler cows can be fed for maintenance for much of the time but they must be fed on a higher plane of nutrition for 6 – 7 months of the year.
- Explain the underlined term.
 - Give **three** reasons for the “higher plane of nutrition”.
- (48 marks)**
7. (a) Explain each of the following:
- The appearance of roan coat colour in Shorthorn cattle.
 - Lack of variation in plants that are propagated by cloning.
 - Continuous variation in many characters associated with higher organisms.
 - Why some defective phenotypes are more common in males than in females.
- (b) In certain species of plants, the allele for straight stamen (**S**) is dominant to the allele for incurved stamen (**s**) and the allele for plain petal (**P**) is dominant to the allele for striped petal (**p**). If pollen from a homozygous straight stamen plain petal flower pollinates a flower with incurved stamens and striped petals:
- State the genotype of the seeds formed.
 - Describe the phenotypes of flowers produced when the seeds germinate and grow.
 - What ratio of offspring phenotypes could result from a cross between the F1 hybrid plant in (i) and a plant that is recessive for both traits?
- (c) Outline the significance of meiosis in reproduction.
- (48 marks)**

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

- (a) (i) Describe **three** ways by which the health of a calf is influenced by its intake of colostrum after birth.
- (ii) Describe **two** environmental factors that need to be considered when housing farm animals.
- (iii) In animal production there are target weights that must be achieved. In the case of replacement heifers give **three** reasons for reaching these targets.
- (b) (i) Explain the technique known as “flushing”, which is used in sheep production.
- (ii) Explain the advantages of each of the following in the management of a flock of sheep:
1. Synchronised breeding
 2. Breeding out of season.
- (iii) Describe the feeding of ewes during the final 6-8 weeks of pregnancy and give reasons for the changes in feeding regime.
- (c) (i) Explain why a good seed bed is essential for successful crop production.
- (ii) Outline the importance of soil moisture in the development of a seedling of a crop.
- (iii) Explain why farm implements called rollers are used during the cultivations of a **named** cereal crop as follows:
1. Preparation of soil for sowing,
 2. After sowing the seed.

(48 marks)

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

- (a) Autumn ploughing as practised in the cultivations for crops.
- (b) Conservation of hedgerows.
- (c) The culling of breeding stock.
- (d) The function of a gizzard in poultry.
- (e) Movement of water from the soil through the plant to the atmosphere.

(48 marks)

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