



**Coimisiún na Scrúduithe Stáit
State Examinations Commission**

LEAVING CERTIFICATE EXAMINATION, 2010

AGRICULTURAL SCIENCE - HIGHER LEVEL

THURSDAY, 24 JUNE – MORNING, 9.30 – 12.00

SIX QUESTIONS TO BE ANSWERED

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

- (a) Certain plants are known as indicator species. Explain the term *indicator species*. Suggest **two** indicator species **and** the conditions in which **each** occurs.
- (b) Draw a labelled diagram of a longitudinal section through a mammalian tooth.
- (c) Account for the increasing popularity of maize silage as a feed for dairy cows.
- (d)
 - (i) What is meant by the pH of a substance?
 - (ii) State the pH values you would expect for
 - 1. Sour milk
 - 2. The contents of the rumen
 - 3. The contents of the abomasum.
- (e) State the purpose of **each** of the following pieces of equipment used in agriculture:
 - (i) soil-auger
 - (ii) refractometer
 - (iii) burdizzo.
- (f) Name the family to which each of the following plants belongs:
 - (i) clover
 - (ii) ragwort
 - (iii) kale.
- (g) In the case of the pig, state
 - (i) the length of gestation
 - (ii) the length of the oestrous cycle.
- (h) Explain how a seed obtains energy during germination.
- (i) Suggest **two** reasons why a farmer might use sulphate of ammonia rather than other forms of artificial nitrogenous fertilisers.
- (j) Briefly describe a symptom of attack on a crop plant by **each** of the following invertebrates:
 - (i) Aphids
 - (ii) Flea beetles
 - (iii) Leatherjackets.

(60 marks)

- 2.
- (a) List **four** factors that are responsible for the development of soil structure.
 - (b) Outline the formation of peat bogs in Ireland.
 - (c) Describe an experiment to estimate the percentage organic matter in a soil sample.

(48 marks)

Option One

3. (a) The calving records on a dairy farm in one year show:
30% purebred Friesian calves born, 55% Continental X Friesian and
15% Aberdeen Angus X Friesian.
The farmer relies on A.I. and has no stock bull. He breeds his own replacements.
- (i) Why was the Friesian breed used **and** on which of his cows?
 - (ii) Why are continental sires used for most inseminations?
 - (iii) Why are Aberdeen Angus bulls used?
 - (iv) What is his replacement rate for culled cows?
- (b) Describe the physiological processes involved in the let-down of milk in farm animals.
- (c) Suggest **four** reasons why dairies will not accept milk from cows that have been recently treated for mastitis.

(48 marks)

OR

Option Two

3. (a) Calcium is an important element in plant growth.
- (i) Outline **one** source of calcium for plants.
 - (ii) Describe **two** processes by which calcium becomes available to plants.
- (b) Hoose is a parasitic disease while grass-tetany is a deficiency disease. Explain the underlined terms. In the case of **either** disease state the cause, a symptom and a method of control or treatment.
- (c) Give **three** reasons for a low rate of seedling establishment in a spring-sown crop.

(48 marks)

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

- (a) The texture of a sample of wet soil.
- (b) The number of earthworms in a pasture.
- (c) The rate of transpiration of a plant.
- (d) The digestibility of rolled barley versus whole barley when fed to cows.

(48 marks)

5. (a) Discuss the role of the following in sheep production:
(i) a raddling harness
(ii) footrot.
- (b) (i) Suggest **four** reasons why dairy farmers find it necessary to reseed their paddocks on a regular basis.
(ii) Suggest a suitable seed mixture that could be used when re-seeding a paddock.
- (c) Explain the significance of the leaf-to-stem ratio in relation to silage quality.

(48 marks)

6. (a) List **four** components of a blight control programme for maincrop potatoes.
- (b) Give **four** reasons why scutch grass (*Agropyron repens*) is considered by tillage farmers to be a troublesome weed.
- (c) Explain the following terms:
(i) *plough pan*
(ii) *nitrogen fixation*.
- (d) Describe how you would calculate the 1000 grain weight of a cereal.

(48 marks)

7. (a) Explain **three** of the following terms:
(i) *freemartin condition*
(ii) *hermaphrodite*
(iii) *artificial selection*
(iv) *pedigree animal*.
- (b) In guinea pigs the allele for black coat (B) is dominant over the allele for brown coat (b). A pair of guinea pigs produces a litter of eight piglets; four of the litter are black and four are brown.
(i) Give the phenotypes and genotypes of the parents.
(ii) Using a Punnett square and labelling all genotypes and phenotypes, illustrate this cross.
(iii) What name is given to this type of cross?
- (c) (i) Explain how polyploidy arises in plants.
(ii) Name **and** give an example of **one** type of polyploidy.
- (d) Account for the importance attached to *index of calving difficulty* in A.I. sire catalogues.

(48 marks)

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

- (a) In the context of fat lamb production, discuss the statement “the ewe looks after quantity while the ram looks after quality”.
- (b) Outline the differences between photosynthesis and respiration in plants.
- (c) Highlight the main differences between the members of any **three** of the following pairs:
 - (i) *farrowing house* and *fattening house* in pig production
 - (ii) *zero grazing* and *creep grazing*
 - (iii) *bull-beef production* and *heifer-beef production*
 - (iv) *ectoparasites* and *endoparasites*.

(48 marks)

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

- (a) The practice in abattoirs of fasting animals before slaughter **and** of allowing the carcasses to hang for some days before sale.
- (b) The increase in the number of fish kills in rivers and lakes in summer.
- (c) The unsuitability of the Holstein breed for single suckling.
- (d) The addition of soya bean meal to cereals in pig rations.
- (e) The inclusion of both conifers and broadleaf trees in shelterbelts.

(48 marks)

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