Coimisiún na Scrúduithe Stáit
State Examinations Commission

LEAVING CERTIFICATE EXAMINATION, 2009

AGRICULTURAL SCIENCE - HIGHER LEVEL

THURSDAY, 18 JUNE – MORNING 09.30 – 12.00

SIX QUESTIONS TO BE ANSWERED

SIX QUESTIONS TO BE ANSWERED

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

(a) (i) To which plant family does clover belong?
(ii) Give **two** agriculturally important characteristics of clover.

(b) (i) Explain the term *hybrid vigour*.
(ii) Mention **two** plant **or** animal examples that show hybrid vigour.

(c) In relation to dairy cows state, in days, the length of each of the following:
(i) Gestation
(ii) Lactation
(iii) Oestrous.

(d) Give **three** reasons for low earthworm populations in certain soil conditions.

(e) Name **three** minerals present in igneous rocks.

(f) Explain the connection between shortening day length and the onset of oestrous in sheep.

(g) Give **three** reasons for the increasing use of artificial insemination (AI) in farm animals.

(h) Explain the functions of the following parts of the digestive system of poultry:
(i) The *crop*
(ii) The *gizzard.*

(i) Draw a labelled diagram of a transverse section of a monocot stem.

(j) Name any **two** plant species or varieties of herbage to be included in a grass-seed mixture for the production of a permanent pasture.

(60 marks)

2. (a) (i) Outline in reasonable detail why care should be taken in removing soil samples from a field before testing the soil fertility levels.
(ii) What is meant by the term *lime requirement*?
(iii) List the elements found in ground limestone.

(b) (i) Explain *cation exchange*.
(ii) Explain the term *cation exchange capacity* (CEC).
(iii) Mention a soil type where CEC is very low.
(iv) Describe a method by which CEC may be increased in a soil.

(c) Describe a laboratory experiment to test a soil for the presence of phosphates.

(48 marks)

Option one

3. (a) Outline the contrasting breeding strategies employed in two differing dairy farms, one involved in liquid milk production, the other a creamery milk supplier.

(b) For a spring-calving maiden heifer construct a graph showing her growth-curve over the two-year period. Your graph should indicate target weights at:
(i) birth
(ii) first winter housing
(iii) service
(iv) calving.

(c) Give **three** reasons for the rest period between the end of one lactation and the start of the next.

(48 marks)

OR

Option two

3. (a) Describe the desirable signs of health in a farm animal.

(b) Discuss the factors which contribute to ewe and lamb mortality.

(c) Describe how the digestibility of a grass sward changes during the growing season.

(48 marks)

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

(a) The percentage germination of a cereal.

(b) The calorific value of a farm animal ration.

(c) The effect of a selective herbicide.

(d) The presence of bacteria in the root nodules of clover.

(48 marks)

5. (a) Describe the cultivation of spring barley **or** main-crop potatoes under the following headings:
(i) Soil requirements
(ii) Rotation
(iii) Weed control
(iv) Yield (tonnes per hectare).

(b) (i) Explain the following terms as they apply to artificial fertilisers:
Placement
Broadcasting
Top-dressing.
(ii) Suggest a crop situation in which **one** of the above methods is used.

(c) Consumer demand in Ireland is for floury (high dry-matter) potatoes.
(i) Suggest a suitable compound fertiliser for the production of floury tubers.
(ii) Give **three** causes of low dry matter in potato tubers.

(48 marks)

6. (a) (i) To what phylum do insects belong?
(ii) Describe a role insects can play in crop production.
(iii) Suggest **two** reasons why the number of some insect species is declining in farm land.
(iv) Name the stages in the life-cycle of an insect that undergoes complete metamorphosis.
(v) Explain what is meant by *incomplete metamorphosis* of insects.

(b) Describe the dental formula of a ruminant.

(c) Describe the process of digestion in the stomach compartments of a ruminant animal.

(48 marks)

7. (a) Explain any **two** of the following terms:
Lethal gene
Recessive gene
Sex-linked gene.

(b) Suggest reasons why the fruit fly (*Drosophila*) is a suitable subject for genetics experiments.

(c) In maize **G** represents green and **g** represents albino. 55 maize seeds are sown and the results show 42 green plants and 13 albino plants. Show by means of suitable crosses how this result might occur starting with homozygous parents.

(d) Briefly outline the principal stages of embryo transfer in cows.

(48 marks)

8. Answer any **two** of the following:

(a) (i) With the aid of a labelled diagram briefly describe the carbon cycle.
(ii) Suggest **one** practice farmers could adopt to reduce the carbon footprint of Irish agriculture.

(b) (i) Compare and contrast slurry and FYM.
(ii) Suggest **two** disadvantages of spreading slurry.

(c) Explain the difference between the terms in any **three** of the following pairs:
(i) Performance testing and progeny testing.
(ii) Systemic and symbiotic.
(iii) Production ration and maintenance ration.
(iv) Glycogen and glucose.

(48 marks)

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

(a) The growing of first early potato crops in specific regions of Ireland.

(b) A greater demand for energy by a farm animal when reared outdoors over the winter.

(c) The failure of cereal seeds to germinate after sowing.

(d) The formation of an iron pan in a soil profile.

(e) The use of plastic in the cultivation of maize.

(48 marks)

Blank Page

Blank Page

Blank Page