Coimisiún na Scrúduithe Stáit
State Examinations Commission

LEAVING CERTIFICATE EXAMINATION 2018

AGRICULTURAL SCIENCE – HIGHER LEVEL

MONDAY, 18 JUNE – MORNING, 9.30 – 12.00

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) Explain the term *livestock unit*.
(ii) Give the livestock unit value for:
1. A mature dairy cow
2. A mature sheep.

(b) Draw a labelled diagram to show the main features of a wind pollinated flower.

(c) (i) State the location in the mammalian body of
1. The thyroid gland
2. The adrenal gland.
(ii) Name **one** hormone secreted by each gland.

(d) (i) Explain the term *food conversion ratio* (FCR).
(ii) List any **two** factors that affect FCR in pigs.

(e) Plants are made of different cell types.
Give the function of **each** of the following plant cell types.
(i) Xylem
(ii) Phloem
(iii) Epidermis.

(f) Describe the functions of the following parts of the avian digestive system.
(i) The gizzard
(ii) The crop.

(g) Give the length of the gestation period, in days, of
(i) Pigs
(ii) Sheep
(iii) Cows.

(h) Draw a labelled diagram of the reproductive system of the cow.

(i) Wool has many qualities that make it useful as a material.
List any **three** of these qualities.

(j) Give **three** reasons why hedgerow conservation is encouraged in Irish agriculture.

(60 marks)

2. (a) (i) Draw a labelled diagram of the soil profile of a named soil type.
(ii) Outline the factors responsible for creating any **two** of the soil horizons shown.

(b) (i) Explain the term *soil texture*.
(ii) Name any **two** soil texture types and compare them under the following headings:
1. Fertility
2. Temperature
3. Drainage
4. Ease of tilling.

(c) Describe an experiment to show the activity of earthworms in the soil.

(48 marks)

[OVER]

3. Option One

(a) (i) Explain the term *body condition score* (BCS).
(ii) State the optimum BCS of a dairy cow at
1. Calving
2. Mating.
(iii) Explain the possible consequences of an animal not being at the optimum BCS at these times.

(b) Dairy cows can be affected by both bacterial diseases and metabolic deficiency disorders.
(i) Give **two** examples of bacterial diseases that can affect dairy cows.
(ii) Give **two** examples of deficiency disorders that can affect dairy cows.
(iii) Describe a preventative measure for **each** example.

(c) (i) Describe the changes in the diet of a beef calf, from birth to weaning.
(ii) Explain how these changes affect the development of the ruminant stomach.

(48 marks)

OR

3. Option Two

(a) Describe with the aid of a labelled diagram the life cycle of a named fungus that affects the potato plant.

(b) Describe the cultivation of a named cereal under the following headings:
(i) Soil requirements
(ii) Climate
(iii) Harvest date
(iv) Yield.

(c) (i) Explain what is meant by indirect control of weeds in crops.
(ii) Give **four** examples of such indirect control.

(48 marks)

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

(a) To determine the percentage (%) sugar in a sample of grass.

(b) To show the effect of shading on crop growth.

(c) To show the action of a named enzyme.

(d) To compare the botanical composition of an old pasture and a newly sown pasture.

(48 marks)

5. (a) Compare mountain/ hill sheep production with lowland sheep production.

(b) Describe the management practices used by sheep farmers at lambing time.

(c) Many Irish sheep farmers now take part in the Sheep Welfare Scheme.
Three of the features of this scheme are
- Lameness control
- Flystrike control
- Scanning of in-lamb ewes.

For each of the above explain
(i) How it is carried out
(ii) The benefit to overall production in the flock.

(48 marks)

[OVER]

6. (a) (i) Describe any **two** commonly used methods of reseeding grassland.
(ii) Explain the term *establishment* in the context of newly-sown grass.
(iii) Describe **two** practices that contribute to successful establishment.

(b) Perennial ryegrass (PRG) and Italian ryegrass (IRG) are commonly sown in Irish grassland.
(i) Compare features of perennial ryegrass and Italian ryegrass that contribute to their productivity.
(ii) Explain the term *hybrid grasses* **and** suggest why they might be used.

(c) Poor grassland management can contribute to an increase in the number of parasites that affect cattle.
(i) Explain how improved grassland management may prevent this happening.
(ii) Name **two** such parasites.

(48 marks)

7. (a) Explain each of the following agriculturally relevant concepts in genetics **and** give an appropriate example in each case.
(i) Polyploidy
(ii) Freemartin condition
(iii) Micropropagation.

(b) *Drosophila melanogaster* is a species of fruit fly commonly used in genetic research. The normal body colour of such flies is grey (GG). A recessive ebony body (gg) is also possible. The flies' antennae can be normal (NN), or twisted (nn), which is a recessive condition.
Outline the details of the cross between two flies, heterozygous for both conditions.

(c) (i) Explain what is meant by embryo transfer in farm animals.
(ii) Give **three** benefits of embryo transfer.

(48 marks)

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

(a) (i) Describe the main processes at work during the conversion of grass to silage.
(ii) Relate **three** practical steps in the making of good quality silage to the processes above.

(b) Three of the major elements needed for good plant growth are nitrogen (N), phosphorus (P), and potassium (K).
(i) In the case of **each** element describe
1. Its function in the plant
2. A deficiency symptom.
(ii) Describe a laboratory experiment to show the effect of the deficiency of a particular element in a plant.

(c) Distinguish clearly between the members of any **three** of the following pairs of terms:
(i) *Zero grazing* and *strip grazing*
(ii) *Contact fungicides* and *systemic fungicides*
(iii) *First early potatoes* and *maincrop potatoes*
(iv) *Abiotic factors* and *edaphic factors*.

(48 marks)

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

(a) Use of a trailing shoe in slurry spreading.

(b) Trees in a forest plantation are thinned at various time intervals.

(c) Algal bloom in waterways following rainfall in summer.

(d) Use of a farrowing crate in pig production.

(e) Growth of rushes in grassland over gley soils.

(48 marks)

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