

WARNING

**This question paper must be returned with your answer book at the end of the examination;
otherwise marks will be lost.**

Write your Examination Number here





Coimisiún na Scrúduithe Stáit **State Examinations Commission**

LEAVING CERTIFICATE EXAMINATION, 2014

AGRICULTURAL SCIENCE - ORDINARY LEVEL

THURSDAY, 19 JUNE – MORNING, 9.30 – 12.00

For the use of the Superintendent only

Centre Stamp

General Directions

THERE ARE TWO SECTIONS IN THIS EXAMINATION PAPER

Section One: **Six** questions must be answered.
Each question carries 20 marks.
Write your answers in the spaces provided in this examination paper.

Section Two: **Three** questions must be answered.
Each question carries 60 marks.
Write your answers in your answerbook.

Total Marks: **300 marks.**

*You should not spend more than 45 minutes on Section One,
leaving 105 minutes for Section Two.*

SECTION ONE

(120 marks)

Instructions

Write your examination number in the space provided on page 1.

Answer **six** questions. Each question carries **20** marks.

Write your answers in the spaces provided.

Keep your answers short.

Question 1.

A list of common animal breeds is given below.

Place these in **Column A** to match a description of each breed in **Column B**.

The first one is completed as an example.

List: Charolais Landrace Scottish blackface Friesian Hereford Texel

A	B
Charolais	Continental beef breed
	Lowland sheep breed
	Pig breed
	Dual-purpose breed
	Mountain sheep breed
	British beef breed

(20 marks)

Question 2.

All the equipment shown below is used in cereal production.

In the table below:

- (a) Write the names of the pieces of equipment to match the letters under the photographs.
(b) Number the pieces of equipment (1 – 5) in the order in which they are normally used in cereal production.
(Used first = 1; Used last = 5).

**A****B****C****D****E**

Letter	(a) Equipment name	(b) Order of use
A		
B		
C		
D		
E		

(20 marks)

Question 3.

Give a brief account of **each** of the following common animal diseases.

(a) **Red water fever:**

Type of animal affected _____

Symptom

(b) **Orf:**

Type of animal affected _____

Symptom

(c) **Anaemia:**

Type of animal affected _____

Symptom

(d) **Viral pneumonia:**

Type of animal affected _____

Symptom

(e) **Grass tetany:**

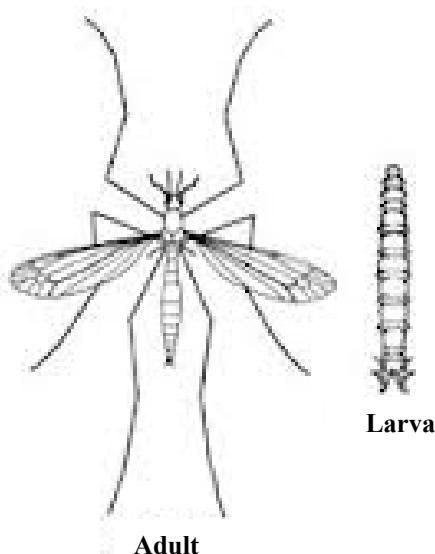
Type of animal affected _____

Symptom

(20 marks)

Question 4.

The adult and the larva of a common crop pest are shown below.



- (a) Name the **adult** insect shown. _____
- (b) State the common name for the **larva** shown. _____
- (c) (i) Name the other **two** stages in the life cycle of this insect.
1. _____
2. _____
- (ii) What name is given to the type of insect life cycle, such as the one above, that has four different stages?

- (iii) Name another insect that has a similar type of life cycle.

- (d) Name a crop that is attacked by the pest shown in the diagram above.

(20 marks)

Question 5.

Indicate if the following statements are true (T) or false (F) by placing a circle around the correct answer in each case. An example is shown.

Example: Rice is a cereal crop grown in Ireland.

T F

- (a) Ewes are in lamb for 283 days. T F
- (b) Buttercup is a member of the family Compositae (Asteraceae). T F
- (c) A bullock is another name for a steer. T F
- (d) Lodging means the collapse of a crop. T F
- (e) In set stocking land is divided into small areas for grazing. T F
- (f) Tuberculosis (TB) is a notifiable disease. T F
- (g) A line transect is used in ecology. T F
- (h) Silage effluent is a serious cause of water pollution. T F
- (i) Ground rock phosphate is used as a fertiliser in forestry production. T F
- (j) The potato plant stores food in rhizomes. T F

(20 marks)

Question 6.

The photograph shows the skull of a sheep, which is a herbivore.



- (a) Explain the term *herbivore*.

- (b) Name any **three** types of tooth that can be seen in the photograph.

1. _____ 2. _____ 3. _____

- (c) Complete the following table to show the dental formula of the sheep.

incisors	canines	pre-molars	molars

- (d) Describe **one** way in which the dental arrangement of a sheep is different to that of a pig.

(20 marks)

Question 7.

Give a scientific reason in each case why the following practices are carried out on Irish farms.

- (a) Selective herbicide is sprayed on cereal crops.

- (b) Beet tops are left to wilt before feeding to animals.

- (c) Tail paint is applied to cows.

- (d) Lime is regularly spread on soil.

- (e) Farm hedges are trimmed only after the first of September.

(20 marks)

SECTION TWO (180 MARKS)

Instructions

Write your answers to Section Two into your answer book.

Answer **three** questions. Each question carries **60** marks.

Question 8.

- (a) Calving is a very important event on the dairy farm.
List **four** steps the farmer can take to help successful calving.
- (b) Colostrum is produced by the cow immediately after calving.
Give **two** differences between colostrum and milk.
- (c) (i) Good hygiene is essential for calf health.
Describe **three** ways in which the farmer ensures good hygiene in calf-rearing.
(ii) Name **two** common diseases of calves.
- (d) The rumen is one of the calf's stomach chambers.
(i) What is the main function of the rumen?
(ii) How can the rumen be helped to develop in the young calf?
(iii) Name the **three** other chambers in the stomach.

(60 marks)

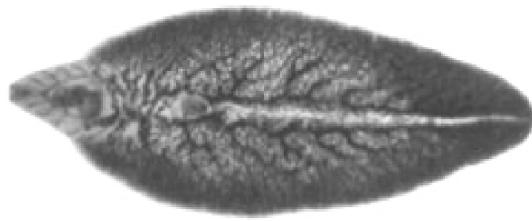
Question 9.

- (a) (i) Name **two** species of grass commonly sown on Irish farms.
(ii) Clover is used in grass seed mixtures. Give **two** benefits of clover.
- (b) Paddock grazing is widely used on dairy farms.
(i) Draw a labelled diagram to show a paddock grazing system.
(ii) Give **two** advantages of paddock grazing.
- (c) Give **two** benefits of mixed grazing of cattle and sheep.
- (d) Calcium ammonium nitrate (CAN) is the most widely used fertiliser on Irish farms.
(i) What is the main plant nutrient found in CAN?
(ii) Describe an experiment to show the effect of CAN on grass growth.

(60 marks)

Question 10.

- (a) List the bodily characteristics to be considered in the selection of breeding ewes in a lowland sheep enterprise.
- (b) Explain the following practices commonly used in sheep breeding:
 - (i) Flushing.
 - (ii) Sponging.
- (c) Describe the changes in the diet of lambs from birth to slaughter.
- (d) The photograph below shows an adult liver fluke (*Fasciola hepatica*), which is a common parasite of sheep.



- (i) Name **one** larval stage in the life-cycle of the liver fluke.
- (ii) Name the secondary host of the liver fluke.
- (iii) Describe **one** symptom of liver fluke infestation in sheep.
- (iv) Give **two** methods of control of liver fluke.

(60 marks)

Question 11.

- (a) Read the following paragraph about the formation and development of podzol soils and match the words **from the list below** with the numbered spaces.

Write your answers in your answer book and not on this examination paper.

List: Iron pan Leaching Forestry Iron B horizon Lime

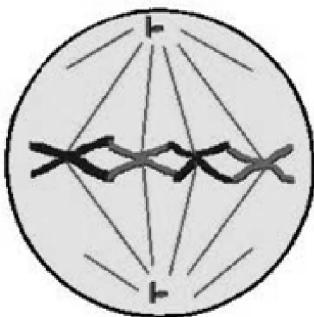
Podzols are poor soils with high 1 and fertiliser requirements. They are formed as a result of 2. Aluminium and 3 are moved from the A horizon to the 4. Podzols show a distinct red layer called the 5. Podzols are widely used for 6.

- (b) Humus is a very important soil component.
 - (i) Describe **three** benefits of humus in the soil.
 - (ii) Give **two** methods of increasing soil humus content.
 - (iii) Describe an experiment to estimate the percentage (%) organic matter in a soil sample.
- (c) Soil texture influences the crops grown on a farm.
 - (i) Explain what is meant by the term *soil texture*.
 - (ii) Compare sandy soils and clay soils under the following headings:
 1. Drainage.
 2. Fertility.
 3. Ease of tilling.

(60 marks)

Question 12.

- (a) Mitosis is one type of cell division.
- List the **four** stages of mitosis in the correct sequence.
 - Which stage of mitosis is shown in the diagram below?
 - Explain what is happening in the stage of mitosis shown below.



- Name the other type of cell division.

- (b) The use of A.I. is very common on Irish farms.
- What do the letters A.I. stand for?
 - State **one** advantage **and** **one** disadvantage of A.I. in cattle.

Make sure to write your answers to parts (c) and (d) in your answer book and not on this examination paper.

- (c) In pea plants the gene for yellow seed (Y) is dominant over the gene for green seed (y). A pea plant homozygous for yellow colour (YY) was crossed with a pea plant homozygous for green colour (yy).

Copy the following into your answer book and complete the spaces (genotypes in brackets, phenotypes on lines).

Genotypes of original parents (YY) × (yy)

(i) Possible gametes () × ()

(ii) F1 genotype ()

(iii) F1 phenotype _____

- (d) **In your answerbook** show a cross between a homozygous recessive plant and an F1 plant from the above cross.

Show the following in your cross:

(i) Genotypes of parents () × ()

(ii) Possible gametes () × () ()

(iii) Genotypes of offspring () ()

(iv) Phenotypes of offspring _____ _____

(60 marks)

Question 13.

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

(30, 30)

- (a) Silage making involves the activity of anaerobic bacteria.
- (i) Explain the term *anaerobic*.
 - (ii) Name **two** species of bacteria that may be involved in silage making.
 - (iii) Describe **two** ways of ensuring anaerobic conditions in the silage pit.
 - (iv) Describe an experiment to show the presence of bacteria in a sample of silage.
- (b) A number of factors are needed for seeds to germinate.
- (i) Explain the term *germination*.
 - (ii) List **three** factors needed for germination to take place.
 - (iii) Give **two** reasons why maize is commonly sown under plastic.
 - (iv) Describe an experiment to investigate the percentage (%) germination in a sample of seeds.
- (c) Earthworms are very important in the soil.
- (i) Name the phylum to which earthworms belong.
 - (ii) List **three** ways in which earthworms benefit the soil.
 - (iii) Outline **two** ways by which the farmer can increase earthworm numbers in the soil.
 - (iv) Describe an experiment to show the activity of earthworms in the soil.
- (d) Concentrates are commonly fed to farm animals.
- (i) Name **two** food nutrients found in concentrates.
 - (ii) Describe the function of **each** of the nutrients referred to in (i).
 - (iii) Explain the term *dry matter (DM)* in relation to animal feed.
 - (iv) Describe an experiment to measure the dry matter content of a **named** animal feed.

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