

WARNING

This Question Paper **MUST** be returned with your answer book at the end of the Examination:  
otherwise marks will be lost.

M. 39

Write your Examination Number here



**Coimisiún na Scrúduithe Stáit**  
**State Examinations Commission**

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**LEAVING CERTIFICATE EXAMINATION, 2004**

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**AGRICULTURAL SCIENCE - ORDINARY LEVEL**

**FRIDAY, 25 JUNE – MORNING 9.30 – 12.00**

*For the Superintendent use only*

Centre Stamp

*General Directions*

THERE ARE TWO SECTIONS IN THIS EXAMINATION

*Section One:* **Six** questions must be answered.  
Each question carries 20 marks.

*Section Two:* **Three** questions must be answered.  
Each question carries 60 marks.

*Total Marks:* 300 marks

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

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**Instructions**

- Answer **six** questions. Each question carries **20** marks.
- Write your answers in the spaces provided.
- Keep your answers short.
- Write your examination number in the space provided.

**Question 1**

(a) Sheep and cattle are herbivores. Explain the underlined word.

\_\_\_\_\_

(b) The diagram shows a molar tooth.

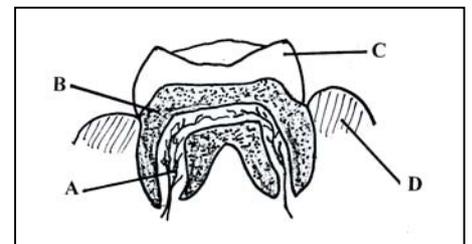
Name the four labelled parts.

A \_\_\_\_\_

B \_\_\_\_\_

C \_\_\_\_\_

D \_\_\_\_\_



(c) Give the dental formula of an adult sheep.

\_\_\_\_\_

(d) What are the molar teeth in sheep used for?

\_\_\_\_\_

**(20 marks)**

**Question 2**

In a dairy unit, many procedures are followed to promote hygiene. Give **one** scientific reason for each of the following:

(a) The provision of fly screens on windows and other openings.

\_\_\_\_\_

(b) The use of a filter in the milking machine.

\_\_\_\_\_

(c) Checking the cow's udder before milking.

\_\_\_\_\_

(d) Rinsing the entire milking machine and lines with detergent solution.

\_\_\_\_\_

(e) Maintaining the temperature of the bulk tank at 4 °C.

\_\_\_\_\_

**(20 marks)**

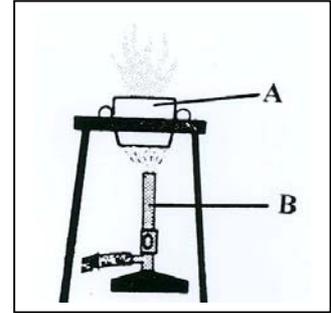
### Question 3

In a laboratory experiment, a student burned off a certain mass of dried soil to find the percentage (%) organic matter, using the apparatus shown.

- (a) Give the correct terms for the parts labelled A and B.

A \_\_\_\_\_

B \_\_\_\_\_



- (b) Why did the student dry the soil at the start of the experiment?

\_\_\_\_\_

- (c) What part of the soil remains after burning?

\_\_\_\_\_

- (d) Explain what **humus** is. \_\_\_\_\_

\_\_\_\_\_

(20 marks)

### Question 4

From your study of the identification of insects associated with agriculture,

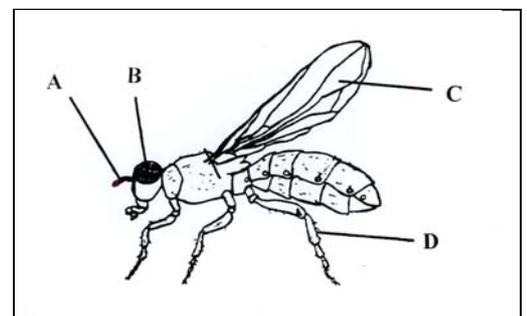
- (a) Name the parts labelled A, B, C and D on the diagram.

A \_\_\_\_\_

B \_\_\_\_\_

C \_\_\_\_\_

D \_\_\_\_\_



- (b) Give **one** beneficial use of insects.

\_\_\_\_\_

- (c) In relation to insects, what happens in **metamorphosis**?

\_\_\_\_\_

\_\_\_\_\_

- (d) Name an **insect parasite**.

\_\_\_\_\_

(20 marks)

### Question 5

(a) In the growing of potatoes, name **one** first early variety.

\_\_\_\_\_

(b) Give **two** conditions needed to ensure sprouting of potatoes.

(i) \_\_\_\_\_

(ii) \_\_\_\_\_

(c) Certified “seed” is important in potato growing. Give **one** reason for this.

\_\_\_\_\_

(d) Name **one** potato pest.

\_\_\_\_\_

**(20 marks)**

### Question 6

Choose a soil component from the following list and place it in column A to match its description in column B.

air, water, gravel, coarse sand, clay, lime.

<b>Column A Soil Component</b>	<b>Column B Description</b>
<b>Example: gravel</b>	<b>Particles larger than 2 mm in diameter</b>
	Dissolves nutrients
	Water-retentive particle that helps plasticity
	Provides oxygen for respiration
	Large particle (> 0.2 mm in diameter) that aids drainage
	Helps flocculation

**(20 marks)**

**Question 7**

- (a) From the following list of sheep breeds, list **two** that are mainly used for **lowland** sheep production.

SUFFOLK, BLACKFACE, WICKLOW CHEVIOT, GALWAY, TEXEL

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- (b) Give **two** bodily characteristics of a named sheep breed.

Name of breed \_\_\_\_\_

1 \_\_\_\_\_

2 \_\_\_\_\_

- (c) How long is the gestation period in sheep?

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- (d) Name **one** sheep disease.

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- (e) Describe **one** of the symptoms of the disease named above.

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**(20 marks)**

## Section Two (180 marks)

### Instructions

Write your answers to Section Two in your answer book.

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

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#### Question 8

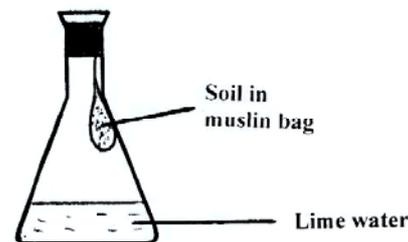
- (a) The main methods of grass conservation in Ireland are silage and hay production.
- Name **two** commonly used grasses in seed mixtures for hay or silage production.
  - Give **two** reasons why these grasses are used.
  - At what stage should grass be cut for good quality silage?
  - Name the **bacteria** needed to make good quality silage.
- (b)
- Describe the sequence of events in the making of good quality silage.
  - Give **three** advantages of silage production over hay production.
  - Give **three** benefits of using baled silage instead of pit silage.
  - Give a scientific reason for using additives in silage making.

(60 marks)

#### Question 9

- (a) The use of artificial fertiliser to supply nitrogen is a common practice, but farmers also have the choice of using a plant species to add nitrogen to the soil.
- Name a plant species found in grass swards that adds nitrogen to the soil.
  - Name the bacteria found in the nodules of the roots of the plant above.
  - Explain what the bacteria you have named in (ii) do.
  - If plants are lacking nitrogen, what are the effects on the plant?
  - Name **one** artificial fertiliser that provides nitrogen for the soil.

- (b) In an experiment to show the presence of micro-organisms, soil was wrapped in a muslin bag in a sealed conical flask, as shown in the diagram.



- What happens to the limewater?
  - Give a reason for the change you have described in (i).
  - Suggest a suitable control for this experiment.
- (c)
- Name **two** major mineral nutrients, other than nitrogen, needed by plants.
  - State a function of a named plant nutrient, other than nitrogen.
  - Name **one** trace element (minor element).
  - Give **two** benefits of liming the soil.

(60 marks)

## Question 10

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

(30, 30)

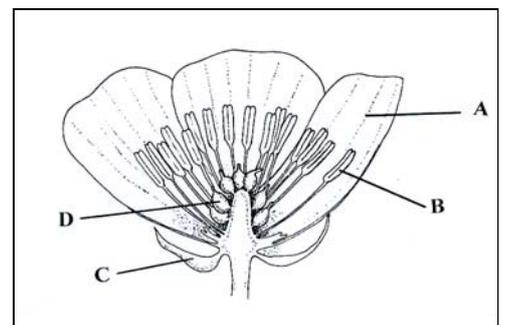
- (a) With regards to the forestry industry;
- Name any **two** coniferous trees planted in Irish forests.
  - State **three** soil characteristics a farmer should consider before planting trees on the farm.
  - Outline briefly the main procedures involved in planting coniferous trees.
  - What is meant by “thinning” and why is it carried out?
- (b) The genetic material DNA is located in the cell nucleus.
- Give the name of the structures that the DNA is found in.
  - Name the **two** types of cell division.
  - In the case of **each** type of cell division, explain what happens the chromosome number.
  - Describe **one** cause of mutation and give an example of a condition resulting from a mutation.
- (c) In the case of a **named** cereal;
- List **three** properties of certified seed.
  - Draw a labelled diagram of the named cereal seed.
  - Suggest a target yield per hectare of the named cereal.
  - Outline how cereal grain is stored.
- (d) In pig production, there are two main breeds in Ireland.
- Name these **two** breeds.
  - State the characteristics of **one** named breed.
  - In animal husbandry, explain what Food Conversion Ratio (FCR) means.
  - Give **two** factors that might influence the FCR of an animal.

(60 marks)

## Question 11

- (a) Answer the following questions in relation to reproduction in flowering plants.

- Identify the parts labelled A, B, C and D in the diagram of a flower.
- Explain how this flower is pollinated. Give **one** reason for your answer.
- Where is pollen produced in the flower?
- Which part of the flower becomes the fruit?



- (b) Micro-organisms include fungi and bacteria.
- Fungi are heterotrophic. Explain the underlined term.
  - How do fungi mainly reproduce?
  - Some fungi cause disease. Outline how a named fungal disease can be controlled in a crop enterprise.
- (c) Describe, with the aid of a labelled diagram, a laboratory investigation to show how you would grow a bacterial culture.

(60 marks)

## Question 12

- (a) In beef production target weights are usually set and Live Weight Gain (LWG) is carefully controlled.
- Give the weights of a beef animal at birth and at finishing at two years old.
  - Explain why animals normally gain less weight during the winter months.
  - Describe the housing conditions required during the first winter in order to maximise production.
  - What is meant by **compensatory growth**?
- (b) Animals use nerves and hormones to sense and respond to their environment.
- Give **two** differences between the mode of action of a nervous and a hormonal response.
  - When a young calf suckles its mother or the cow enters the parlour, milk is said to be “let down”. Name the hormone involved in this process.
  - Outline the characteristics influenced by testosterone in male animals.
  - Distinguish between “scanning” and “sponging” in sheep production.
  - Give one advantage of “scanning”.

(60 marks)

## Question 13

- (a) Describe, with the aid of labelled diagrams, an investigation to prepare and stain a plant cell for viewing under the microscope.
- (b) In the fruit fly (*Drosophila*), the colour of the body is controlled by a gene. The allele for grey body (**G**) is dominant over the allele for ebony body (**g**), which is recessive.
- Explain the underlined terms.
  - Copy the following into your answer book and complete the spaces (genotypes in brackets, phenotypes on lines) to outline the following cross.

The genotypes of the original parents	( <b>GG</b> )	X	( <b>gg</b> )
The gametes produced by each parent	( )	X	( )
The genotype of the offspring ( <b>F1</b> )	( )		
The phenotype of the offspring ( <b>F1</b> )	_____		

- The offspring of the above cross were crossed with a fruit fly homozygous for ebony body. Copy the following into your answer book and complete the spaces (genotypes in brackets, phenotypes on lines) to outline this cross.

The genotypes of the second generation parents	( )	X	( )	
The gametes produced by each parent	( )	( )	X	( )
The genotypes of the second generation	( ) ( )			
The phenotypes of the second generation	_____			

(60 marks)

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