

**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**

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**LEAVING CERTIFICATE EXAMINATION, 2015**

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**AGRICULTURAL SCIENCE – ORDINARY LEVEL**

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**THURSDAY, 18 JUNE – MORNING, 9.30 – 12.00**

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*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 the 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)

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### 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.

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### Question 1.

A list of plant parts is given below.

Place these in **Column A** to match the description of each part in **Column B**.

The first one is completed as an example.

**List:** Stamens; Phloem; Petals; Xylem; Carpels; Stomata.

A	B
Petals	Attract bees and insects
	Male parts of flower
	Transports water through plant
	Openings on underside of leaf
	Female parts of flower
	Transports food through plant

(20 marks)

**Question 2.**

Some organisms of importance in agriculture are listed in the table below.

In the table, name the phylum to which each organism belongs **and** state **one** reason why the organism is important in agriculture.

<b>Organism</b>	<b>Phylum</b>	<b>Importance in Agriculture</b>
Roundworm		
Liver Fluke		
Butterfly		
Mud Snail		

**(20 marks)**

**Question 3.**

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

**Example:** Suffolk is a breed of cow.

T

**F**

(a) Germination is the production of food in the leaf.

T

F

(b) Pneumonia is a common disease of **calves**.

T

F

(c) Biuret reagent is used to test for protein.

T

F

(d) Urea is a high nitrogen fertiliser.

T

F

(e) Oak is a coniferous tree.

T

F

(f) Powdery mildew is a disease of **barley**.

T

F

(g) Incisors are teeth used for cutting food.

T

F

(h) A hogget is a type of pig.

T

F

(i) Kale is an example of a catch crop.

T

F

(j) Cows reach their peak milk yield one week after calving.

T

F

**(20 marks)**

**Question 4.**

Four spring cereal crops commonly grown in Ireland are shown below.



A



B



C



D

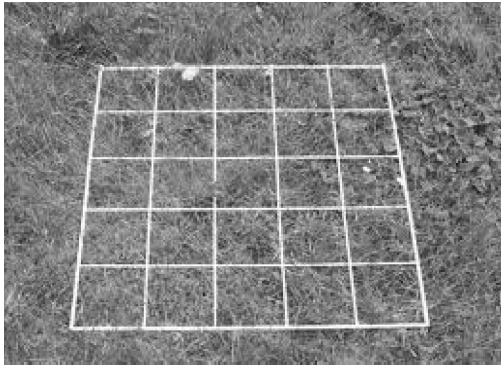
In the table, identify **one** of the crops shown above and complete the table in relation to the crop you have chosen.

Crop A, B, C or D <input type="text"/>	Name of crop <input type="text"/>
<b>Time of sowing</b>	
<b>Use of crop</b>	
<b>Seeding rate (kg/ha)</b>	
<b>Yield of crop (t/ha)</b>	

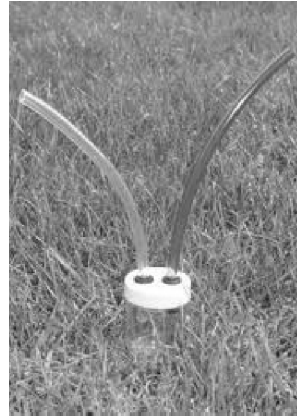
**(20 marks)**

**Question 5.**

Four pieces of apparatus commonly used in habitat study are shown below.  
In the table, give the **name and use** for each piece.



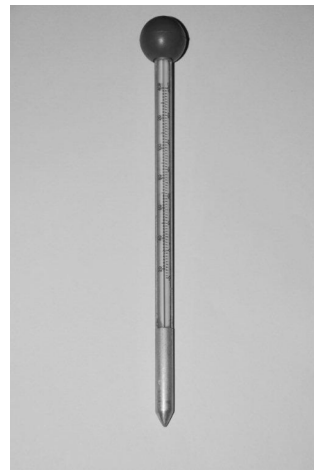
**A**



**B**



**C**



**D**

<b>Apparatus</b>	<b>Name</b>	<b>Use</b>
<b>A</b>		
<b>B</b>		
<b>C</b>		
<b>D</b>		

**(20 marks)**

**Question 6.**

Four common diseases of cattle that are caused by microorganisms are listed in the table below. In the table, state which type of microorganism is responsible for causing each disease **and** one method of prevention or treatment of each disease.

**One example is given in the table.**

<b>Disease</b>	<b>Microorganism Type</b>	<b>Prevention/Treatment</b>
<b>TB</b>	<b>Bacteria</b>	<b>Breeding own replacements</b>
<b>Mastitis</b>		
<b>Pneumonia</b>		
<b>Ringworm</b>		
<b>Blackleg</b>		

**(20 marks)**

**Question 7.**

Give **one** scientific reason why **each** of the following practices is carried out on Irish farms.

(a) Sheep are culled from the flock.

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(b) Cows are ‘dried off’ two months before calving.

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(c) Trees in a forest plantation are thinned after about twenty years.

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(d) Lime is spread on some soils.

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(e) Great care is taken when agitating slurry.

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**(20 marks)**

## SECTION TWO (180 MARKS)

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### Instructions

Write your answers to Section Two into your answer book.

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

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#### Question 8.

The two most common methods of grass conservation used in Ireland are silage production and hay production.

- (a)
  - (i) Name **two** grass species commonly used in silage or hay production.
  - (ii) At what stage should the grass be cut for good quality silage?
  - (iii) A long spell of dry weather is essential for making hay.  
What is the scientific reason for this?
  - (iv) Give the **name** of a bacterial species needed to make good quality silage.
- (b)
  - (i) Describe the steps you would carry out to make good quality hay.
  - (ii) Give **three** advantages of silage production over hay production.
  - (iii) Give **three** advantages of round bale silage over pit silage.
- (c) Describe a laboratory or field experiment to estimate percentage (%) dry matter in a silage sample.

(60 marks)

#### Question 9.

Beef breeds and dairy breeds are commonly found on Irish cattle farms.

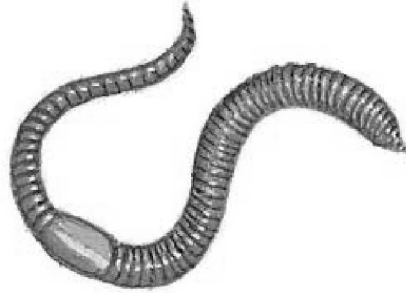
- (a)
  - (i) Name **two** beef breeds and **two** dairy breeds.
  - (ii) Describe **three** differences between the conformation of beef and dairy breeds.
- (b)
  - (i) Condition scoring is an important skill in cattle farming.  
Explain what is meant by *condition scoring* in cattle.
  - (ii) What condition score is recommended for cows at mating?
  - (iii) Explain why a high condition score in cows can cause problems at calving.
- (c)
  - (i) State **two** precautions that should be taken when buying in replacement heifers.
  - (ii) Describe **two** common practices aimed at keeping livestock diseases from entering a farm.

(60 marks)



**Question 10.**

- (a) The main mineral component of soil is made up of different particles of weathered rock.
- (i) State **three** methods of physical weathering.
  - (ii) Name any **three** soil particle types.
- (b) (i) Explain the term *soil texture*.
- (ii) Describe an experiment to determine the texture of a soil sample.
- (c) Organisms such as the one shown below are of great benefit to the soil.

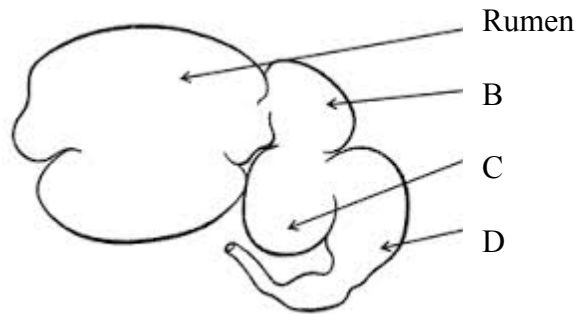


- (i) Name the organism shown above.
- (ii) Mention **two** ways in which the above organism benefits the soil.
- (iii) Describe an experiment to estimate the number of these organisms in the soil.

**(60 marks)**

**Question 11.**

The ruminant stomach is shown in the diagram below.



- (a) (i) The cow has a ruminant stomach.  
Name: 1. **one** other livestock species that has this type of stomach **and**  
2. **one** livestock species that **does not** have this type of stomach.
- (ii) Name the chambers of the stomach labelled B, C and D.
- (iii) Which chamber of the ruminant stomach most closely resembles the monogastric stomach?
- (b) (i) Name the **main** constituent of grass that is digested in the ruminant stomach.
- (ii) Food is regurgitated from chamber B.  
How does this benefit the animal?
- (iii) What happens to the food in chamber C?
- (iv) Precisely which part of the digestive system does food enter when it leaves part D?
- (c) (i) Describe how the diet of the calf is changed over the first twelve weeks of life.
- (ii) Bloat is a common disorder in cattle. What causes bloat?

**(60 marks)**

**Question 12.**

- (a) (i) Draw a simple diagram of a plant cell as seen under a light microscope.  
Label any **three** parts, other than chromosomes.
- (ii) Where in the cell are the chromosomes found?
- (iii) Name the process by which an animal or plant cell divides into two identical cells.
- (b) In wheat, the allele for red kernel (R) is dominant over the allele for white kernel (r).  
A wheat plant, homozygous for red kernel (RR), is crossed with a plant homozygous for white kernel (rr).

**Copy the following into your answer book and complete the spaces.**

Genotypes of original parents	(RR)	×	(rr)
(i) Possible gametes	○	×	○
(ii) F1 genotype	( )		
(iii) F1 phenotype	_____		

- (c) **In your answer book**, show a cross between a homozygous recessive plant and an F1 plant from the above cross.

Show the following in your cross:

	Homozygous recessive		F1 from above
(i) Genotypes of parents	( )	×	( )
(ii) Possible gametes	○	×	○ ○
(iii) Genotypes of offspring	( )		( )
(iv) Phenotypes of offspring	_____		_____

**(60 marks)**

**[OVER**

**Question 13.** Answer any **two** of the parts (a), (b), (c), (d).

**(30 marks, 30 marks)**

- (a) (i) State the length in **days** of the gestation period in ewes.  
(ii) Give any **three** reasons for housing sheep at lambing time.  
(iii) List **three** features of winter housing for sheep.  
(iv) Describe the use of the following at lambing time:  
1. The infra-red lamp  
2. The fostering crate.
- (b) (i) Name **one** variety of **each** of the following categories of potato:  
1. First early potatoes  
2. Second early potatoes  
3. Maincrop potatoes.  
(ii) Explain why seed potatoes are mainly grown in Co. Donegal.  
(iii) Give **two** reasons for earthing-up of potatoes.  
(iv) State **two** conditions needed for the storage of harvested potatoes.
- (c) The table below shows an average composition of cow's milk.

Constituent	Percentage (%)
A	87.5
Lactose	4.6
Fats	3.8
B	3.3
Minerals and vitamins	0.8

- (i) Identify A and B from the table.  
(ii) A number of factors affect fat content in milk. List any **three** of these factors.  
(iii) To ensure milk is of good quality, it is tested in a number of ways.  
List any **three** of these tests, **other than** tests for fat or protein content.  
(iv) Explain any **two** management practices to ensure good hygiene at milking.
- (d) In pig production, the sow is moved to the farrowing house to have her bonhams (piglets).
- (i) What is the temperature in the farrowing house?  
(ii) Name **two** other parts of a pig production unit.  
(iii) Explain the use of the farrowing crate.  
(iv) Describe **two** practices carried out on newly born bonhams.  
(v) At what age are bonhams normally weaned?  
(vi) Food conversion ratio (FCR) is a very important consideration in pig production.  
Explain the term *FCR*.

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