

**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 2020**

**AGRICULTURAL SCIENCE – ORDINARY LEVEL**

**2 hours 30 minutes**

*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) Soil sieves, as shown, are used in the laboratory to find the texture of a soil sample.

What is meant by the term *soil texture*?

---

---

---



- (b) Using any suitable method, outline the steps you would take to find the texture of a soil sample in the laboratory.

---

---

---

---

---

- (c) Give a reason behind any **one** of the steps in (b).

---

---

---

## Question 2.

- (a) Complete the table below for each of the named farm animals.

Animal	Length of gestation (pregnancy)	Birth weight of offspring (kg)
Pig		
Sheep		
Cow		

- (b) (i) What is colostrum?

\_\_\_\_\_

- (ii) Give **two** reasons why colostrum is important.

1. \_\_\_\_\_

2. \_\_\_\_\_

## Question 3.

Indicate whether each of the following statements is true (T) or false (F) by drawing a circle around the correct answer in **each** case. An example is shown.

**Example: Incisor teeth are used to chew food.**

T

**F**

- (a) Stomata are pores found on the leaves of plants.

T

F

- (b) Pigs are ruminant animals.

T

F

- (c) Malting barley is used in the production of alcohol.

T

F

- (d) Brucellosis in cattle is caused by bacteria.

T

F

- (e) Clover is a nitrogen-fixing plant.

T

F

- (f) Golden Wonders are a 'first early' variety of potatoes.

T

F

- (g) Sandstone is an igneous rock.

T

F

- (h) LWG stands for lower weight gain.

T

F

- (i) The right ventricle of the heart pumps blood around the body.

T

F

- (j) The larva of the crane fly is called a leatherjacket.

T

F

#### Question 4.

Name **and** state the function of **each** item of farm equipment and machinery shown below.

Item A has been completed for you in the table.



**A**



**B**



**C**



**D**



**E**



**F**

Item/Machine	Name	Function
<b>A</b>	<b>Roller</b>	<b>To break soil clumps or to level soil or to increase seed contact with soil or to remove air pockets from soil</b>
<b>B</b>		
<b>C</b>		
<b>D</b>		
<b>E</b>		
<b>F</b>		

### Question 5.

- (a) State **two** sources of pollution on a farm.

Source 1. \_\_\_\_\_

Source 2. \_\_\_\_\_

- (b) Describe the harmful effects of **each** of the above sources of farm pollution.

Effect of source 1. \_\_\_\_\_

\_\_\_\_\_

Effect of source 2. \_\_\_\_\_

\_\_\_\_\_

- (c) Increasing levels of carbon dioxide gas (CO<sub>2</sub>) in the atmosphere contribute to global warming.

State **two** farming practices that can lead to a reduction in carbon dioxide levels in the atmosphere.

Practice 1. \_\_\_\_\_

Practice 2. \_\_\_\_\_

### Question 6.

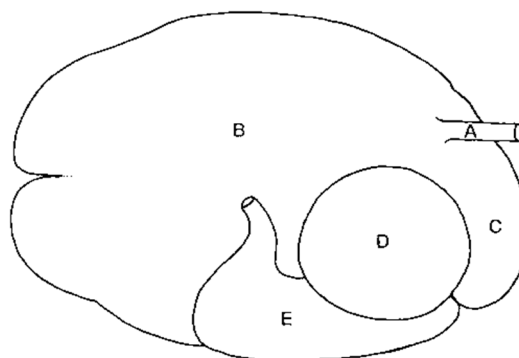
- (a) The diagram shows some parts of the ruminant digestive system.

Part A is the oesophagus.

Name the parts labelled B, C, D and E.

B \_\_\_\_\_ C \_\_\_\_\_

D \_\_\_\_\_ E \_\_\_\_\_



- (b) Match **each** of the labelled parts with its correct function in the table below.

Function	Part (letter only in each case)
Squeezes, and absorbs water	
Pushes food back up into the mouth	
Completes digestion of food	
Contains bacteria and protozoans which digest cellulose	

### Question 7.

State **one** reason for **each** of the following farm practices.

- (a) Vaccination of farm animals.

---

---

---

- (b) Using footbaths on a sheep farm.

---

---

---

- (c) Growing certified seed potatoes.

---

---

---

- (d) Subsoiling a soil.

---

---

---

- (e) Maintaining hedgerows.

---

---

---

---

**Instructions**

**Write your answers to Section Two into your answer book.**

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

---

**Question 8.**

- (a) (i) Draw a labelled diagram of a paddock grazing system.
- (ii) State **two** advantages **and two** disadvantages of paddock grazing.
- (b) Hay and silage are made on Irish farms.
- (i) Outline **four** steps involved in making good quality hay **and** explain why any **one** of those steps is important.
- (ii) The following steps are taken when making good quality silage.  
State **one** reason for **each** of the steps listed below.
1. Cutting the grass on a sunny day.
  2. Allowing the cut grass to wilt.
  3. Rolling or baling the cut grass.
  4. Covering the grass in plastic.
- (c) Describe a simple on-site test that a farmer can carry out on silage.  
Give a possible result of this test **and** say what the result means about the quality of the silage.

### Question 9.

- (a) (i) Farmers use ground limestone ( $\text{CaCO}_3$ ) to raise the pH of the soil.

Which chemical element in ground limestone is the most important in raising the soil pH?

- (ii) State **two** ways in which a soil may become acidic.
- (iii) Describe how you would find the pH of a soil sample.

- (b) 10-10-20 is a common compound fertiliser used on Irish farms.

- (i) Name the three principal plant nutrients in 10-10-20.
- (ii) State the function of any **one** of the plant nutrients in 10-10-20.



- (c) Farmyard manure (FYM) and slurry are two forms of farm animal waste.

- (i) State how **each** is stored on a farm.
- (ii) State **two** differences between the composition of FYM and the composition of slurry.
- (iii) Slurry has to be agitated before it can be spread.

State **two** precautions taken by farmers when agitating slurry.



### Question 10.

- (a) There are 60 chromosomes in the somatic cells (body cells) of cattle.
- (i) How many chromosomes are in the gametes of cattle?
  - (ii) Name the organ in which the female gametes are produced in cattle.
  - (iii) Name the type of cell division that produces gametes.
- (b) In maize the allele for green seedlings (G) is dominant over the allele for albino seedlings (g). A maize plant, homozygous for green (GG), was crossed with a maize plant homozygous for albino (gg).

**Copy and complete this cross in your answerbook.**

Parent phenotypes	Green		Albino
Parent genotypes	(GG)	x	(gg)
Gametes	( )	x	( )
Genotype of offspring	( )		
Phenotype of offspring	_____		

- (c) Two plants with the same genotype as the offspring above were crossed with each other.  
**Copy and complete the following into your answerbook**, to give the possible genotypes and phenotypes from this cross.

Plant genotypes	( )	x	( )		
Possible gametes	( )	( )	x	( )	( )
Genotypes of offspring	( )	( )	( )		
Phenotypes of offspring	_____		_____		

- (d) Cross breeding is commonly used in agriculture.
- (i) What is meant by the term *cross breeding*?
  - (ii) State **one** advantage of a cross breeding system.

### Question 11.

- (a) (i) Name **two** breeds of dairy cow.
- (ii) State why any **one** of these breeds is suitable as a dairy breed.
- (iii) Cows are culled on dairy farms.
- State **two** reasons why dairy cows are culled.
- (b) A dairy enterprise needs replacement heifers.
- (i) Name **two** desirable characteristics of replacement heifers.
- (ii) At what age should a heifer give birth to her first calf?
- (iii) What is the target weight for a heifer when she gives birth to her first calf?
- (iv) State **two** signs that a farmer would notice in a heifer when she is about to give birth.
- (c) (i) What is meant by the term *body condition scoring*?
- (ii) How is the body condition score of a cow assessed?
- (iii) What would cause a cow to have a low body condition score?
- (iv) What is a desirable body condition score for a cow at calving?

## Question 12.

(a) (i) State **two** ways in which the structure of a leaf is suited to photosynthesis.

(ii) A leaf stores the starch it makes during photosynthesis.  
To test a leaf for the presence of starch, the following method is used.

1. Place the leaf in boiling water for a few seconds.
2. Boil the leaf in alcohol or methylated spirits.
3. Rinse the leaf in warm water.
4. Pour iodine solution on the leaf.

State why **each** of the above procedures is carried out.

(iii) After the above steps, what colour is produced in the leaf if starch is present?

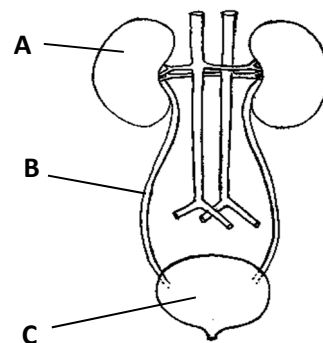
(b) (i) The diagram shows part of an animal's excretory system.

What does the term *excretion* mean?

(ii) **In your answerbook**, name the parts of the diagram labelled A, B, C.

(iii) Name **two** substances removed from the blood as it passes through part A.

(iv) Name **two** other organs of excretion in a farm animal's body.



(c) (i) **In your answerbook**, name the parts of the flower labelled A, B, C, D.

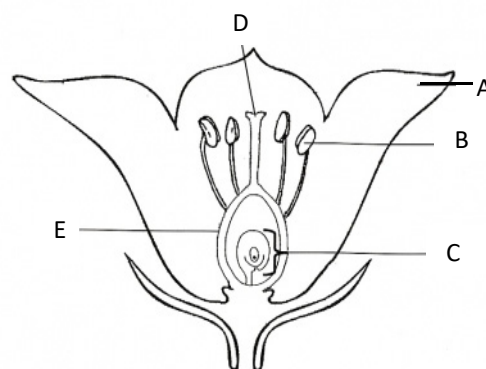
(ii) Is this flower wind pollinated or insect pollinated?

State **two** reasons for your answer.

(iii) What does the part labelled E develop into?

(iv) What does the part labelled C develop into?

(v) State **three** conditions necessary for seeds to germinate.



### Question 13.

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

**(30 marks, 30 marks)**

- (a)
  - (i) Name **two** factors that can affect soil temperature.
  - (ii) What is a loam soil?
  - (iii) State **two** advantages of a loam soil.
  - (iv) State **two** ways that earthworms may improve the soil.
  - (v) What may cause a decrease in the earthworm population of a soil?
  
- (b)
  - (i) Describe winter barley **or** spring barley under the following headings:  
1. Time of sowing.    2. Time of harvesting.    3. Expected yield.
  - (ii) Name a disease of barley.
  - (iii) Name a pest of barley.
  - (iv) State **two** factors that allow grain to be stored safely over the winter.
  
- (c) Describe the management of lowland lambs under the following headings:
  - (i) Care at birth.
  - (ii) Changes in diet.
  - (iii) Housing.
  - (iv) Disease control.
  - (v) Age at weaning.
  
- (d)
  - (i) State **two** functions of dietary protein in a farm animal's body.
  - (ii) Describe how to test a food for the presence of protein.
  - (iii) Distinguish between bulky feeds and concentrates **and** give an example of **each**.
  - (iv) What is meant by the term *maintenance ration*?
  - (v) What is meant by the term *production ration*?