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, 2016

AGRICULTURAL SCIENCE - ORDINARY LEVEL

THURSDAY, 23 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) Name **two** sedimentary rocks and **two** metamorphic rocks from the following list:

Basalt, marble, sandstone, granite, quartzite, limestone.

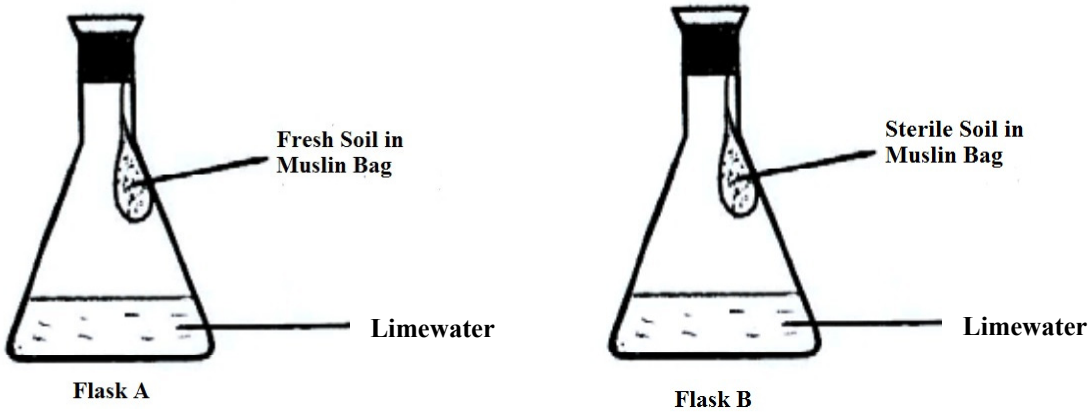
(i) Two sedimentary rocks.

1. _____ 2. _____

(ii) Two metamorphic rocks.

1. _____ 2. _____

(b) An investigation on soil was carried out. Two flasks were set up as shown in the diagram. The flasks were left at room temperature for two days. At the end of the two days the limewater in one flask had turned white in colour.



(i) In which flask did the limewater change colour? _____

(ii) Explain why the limewater changed colour.

_____

_____

(iii) How was the soil in flask B sterilised?

_____

(iv) One of the flasks was used as a control. What is meant by this?

_____

(20 marks)

Question 2.

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*: Applying ground limestone to grassland lowers the soil pH.**		**T**	**(F)**
(a)	Grass tetany in dairy cows is caused by a lack of calcium.	T	F
(b)	Clover increases the protein content of a sward.	T	F
(c)	Scots Pine is a broadleaved tree.	T	F
(d)	Tillering is the development of side shoots in a grass plant.	T	F
(e)	The length of gestation in pigs is approximately 115 days.	T	F
(f)	Iodine solution is used to test for the presence of glucose in food.	T	F
(g)	The omasum is found in a pig's digestive system.	T	F
(h)	Sheep do not have incisor teeth.	T	F
(i)	Chickens have a gizzard in their digestive system.	T	F
(j)	A sub-soiler is used to improve drainage in soil.	T	F

(20 marks)

[OVER]

Question 3.

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

(a) Choosing Holstein-Friesian cows for a dairy farm.

_____

_____

_____

(b) Carrying out a soil test before sowing a crop.

_____

_____

_____

(c) Growing a catch crop on a farm.

_____

_____

_____

(d) Spreading slurry at certain times of the year only.

_____

_____

_____

(e) Practising crop rotation.

_____

_____

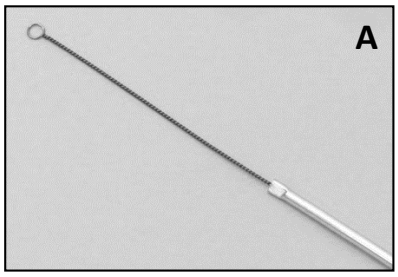
_____

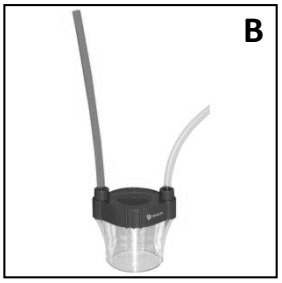
(20 marks)

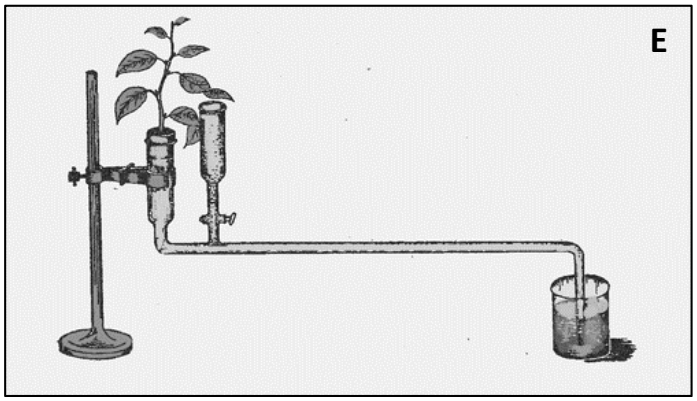
Question 4.

The following images show equipment used when conducting experiments in Agricultural Science.

In the table, match the letter on the image with the name of the equipment **and** state the main use of each piece of equipment.







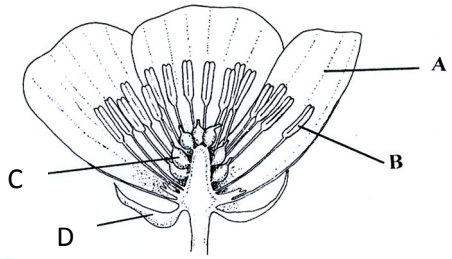
Equipment	Letter	Main Use
Soil sieves		
Potometer		
Inoculating loop		
Refractometer		
Pooter		

(20 marks)

[OVER]

Question 5.

(a) The diagram shows a flower.



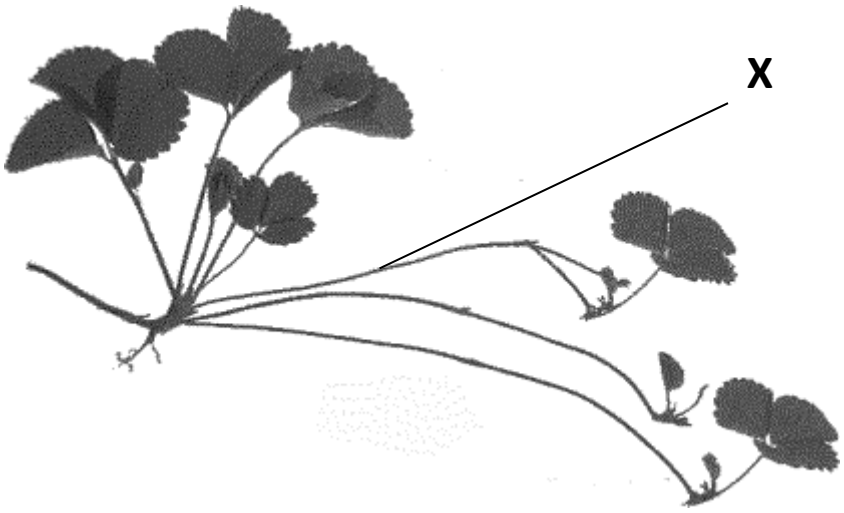
(i) Name the parts A, B and C.

A. _____ B. _____ C. _____

(ii) What is the function of part D? _____

_____

(b) The picture shows a strawberry plant.



(i) Part X is called a _____

(ii) The strawberry plant is shown reproducing without seeds.
What is this type of reproduction called?

_____

(iii) Plants produced by this method are genetically identical.
What name is given to a group of genetically identical plants?

_____

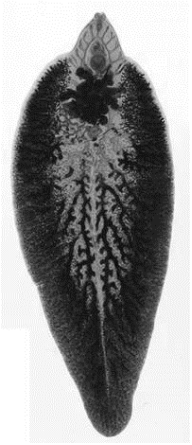
(iv) Name the method of reproduction in flowering plants in which seeds are formed.

_____

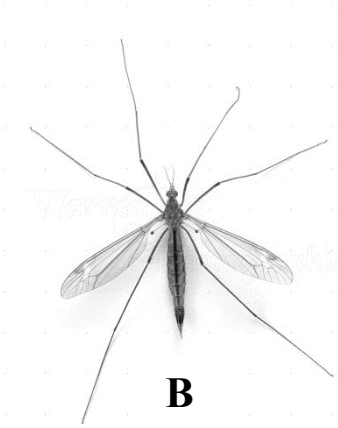
(20 marks)

Question 6.

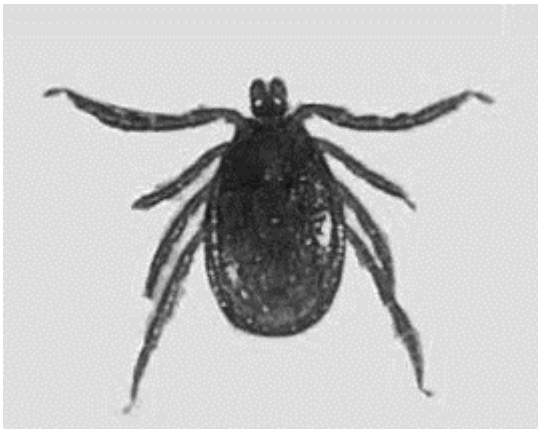
(a) The invertebrates pictured are of agricultural importance. Name **each** of them.



A



B



C

(i) Invertebrate A is _____

(ii) Invertebrate B is _____

(iii) Invertebrate C is _____

(b) State the agricultural importance of each invertebrate.

(i) The agricultural importance of A is _____

_____

(ii) The agricultural importance of B is _____

_____

(iii) The agricultural importance of C is _____

_____

(iv) Which of the above invertebrates has a larva called a miracidium? _____

(20 marks)

[OVER]

Question 7.

Barley is a cereal crop commonly grown in Ireland.

Barley

Barley crop showing "tramlines"

(a) Give **two** uses for barley.

(i) _____

(ii) _____

(b) State **two** features of a barley crop when it is ready for harvesting.

(i) _____

(ii) _____

(c) State a reason for **each** of the following practices when growing barley.

(i) Providing "tramlines".

_____

_____

(ii) Using a combine drill.

_____

_____

(iii) Rolling.

_____

_____

(iv) Harvesting when weather is dry.

_____

_____

(20 marks)

SECTION TWO (180 marks)

Instructions

Write your answers to Section Two into your answer book.

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

Question 8.

(a) (i) Name **one** grass **and one** other plant species suitable for best quality grazing for livestock.
(ii) Give a reason for the use of **each** of the named species.
(iii) Describe **one** method of sowing a field for pasture.

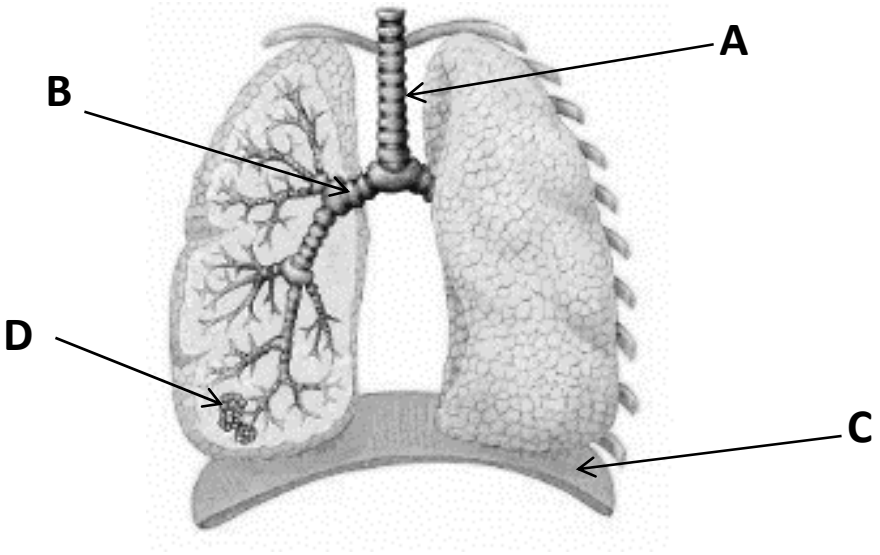
(b) Some farmers make bales of silage rather than pit silage.
(i) State **two** advantages of baled silage.
(ii) State **two** disadvantages of baled silage.

(c) Describe any **two** tests that a farmer can undertake to assess the quality of pit silage.

(60 marks)

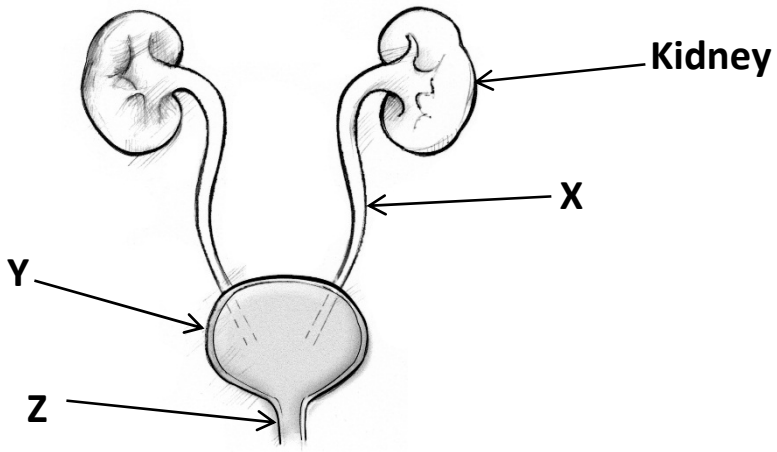
Question 9.

(a) The diagram shows the respiratory system of a farm animal.



(i) Name the parts A, B and C.
(ii) State the function of part D.
(iii) Viral pneumonia is a common illness which can occur during calf housing. How can viral pneumonia be prevented?
(iv) Describe briefly the life cycle of lungworms.
(v) Outline **one** method of control of lungworms in cattle.

(b) The diagram shows the urinary system of a farm animal.



(i) State a function of the kidneys.
(ii) Name the parts X, Y and Z.
(iii) What is stored in part Y?

(c) Redwater fever is a disease of cattle. Briefly outline how redwater fever can spread in a cattle herd.

(60 marks)

Question 10.

(a) (i) Explain how potato blight reduces the yield of maincrop potatoes.
(ii) Describe **two** symptoms of potato blight.
(iii) Outline **two** methods of preventing potato blight.

(b) Describe the cultivation of potatoes under the following headings:
(i) Soil suitability.
(ii) Method of sowing.
(iii) Weed control.
(iv) Harvesting.

(c) Describe an experiment to find the percentage (%) water in a sample of potatoes.

(60 marks)

Question 11.

(a) Compare sandy soils and clay soils under the following headings:
(i) Drainage.
(ii) Fertility.
(iii) Organic matter content.
(iv) Soil temperature.

(b) (i) Outline **two** ways by which the number of earthworms in grassland could be increased.
(ii) Explain how earthworms are beneficial in grassland.
(iii) Name the phylum to which earthworms belong.
(iv) Draw a diagram of an earthworm and label **three** parts.

(c) (i) Why is nitrogen needed in plants?
(ii) Name **two** artificial fertilisers which contain nitrogen.
(iii) Give **two** reasons why leaching of nitrogen from soil is undesirable.
(iv) What role does clover play in the nitrogen cycle?

(60 marks)

[OVER]

Question 12.

(a) (i) Where in a cell are chromosomes found?
(ii) State a function of chromosomes.
(iii) There are 54 chromosomes in a body cell of a sheep.
How many chromosomes are there in a gamete of a sheep?

(b) In Aberdeen Angus cattle, the allele for the polled (hornless) condition (P) is dominant to the allele for having horns (p). A pure breeding polled bull and a cow with horns are crossed. What will be the genotype and phenotype of their calf?
Copy the following into your answer book and complete the spaces (genotype in brackets, phenotype on line).

	Genotypes of parents	(PP) × (pp)
(i)	Gametes	( ) × ( )
(ii)	Genotype of calf	( )
(iii)	Phenotype of calf	_____

(c) A heifer resulting from the cross in part (b) is crossed with a bull that is heterozygous for horns. What are the possible genotypes and phenotypes of their calves?
Copy the following into your answer book and complete the spaces (genotypes in brackets, phenotypes on lines).

(i)	Genotypes of parents	( ) × ( )
(ii)	Possible gametes	( ) ( ) × ( ) ( )
(iii)	Possible genotypes of calves	( ) ( ) ( )
(iv)	Possible phenotypes of calves	_____ _____

(d) (i) What is cross-breeding?
(ii) State, using examples, the advantages of cross-breeding in sheep production.

(60 marks)

Question 13.

Answer any **two** of (a), (b), (c), (d). **(30 marks, 30 marks)**

(a) (i) Name **two** of the most common lowland breeds of sheep farmed in Ireland.
(ii) In the case of **one** of these breeds state **two** characteristics of the breed.
(iii) Describe the management of lambs from birth to weaning.
(iv) Distinguish between flushing and steaming-up in lowland sheep production.

(b) (i) Name **two** breeds of pig used in pig production in Ireland.
(ii) Describe the management of a sow in the dry sow house **and** in the farrowing house.
(iii) State the cause of anaemia in bonhams (piglets) **and** describe how it can be prevented.
(iv) What criteria are used when selecting a gilt for breeding?

(c) (i) Outline the precautions taken to reduce calf deaths at calving time on a dairy farm.
(ii) Give **two** reasons why colostrum is fed to newly born calves.
(iii) Describe **two** management practices which would result in the production of clean milk in the milking parlour.
(iv) Give **three** reasons for culling cows from the herd.

(d) Carbon dioxide levels in the atmosphere have become the subject of international concern in recent years, as demonstrated by the United Nations Climate Change Conference held in Paris in December 2015.

(i) What happens to carbon dioxide during photosynthesis in green plants?
(ii) Name the major pigment needed by plants for photosynthesis.
(iii) Describe, with the aid of a labelled diagram, a laboratory experiment to show that carbon dioxide is needed for photosynthesis.

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