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, 2011

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.

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.

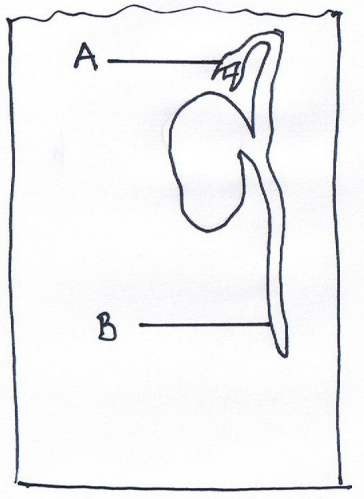
SECTION ONE (120 marks)

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 on page 1.

Question 1.

(a) The diagram on the right shows a germinating broad bean seed. Identify the parts labelled A and B.



A. _____

B. _____

(b) List the **three** conditions necessary for seed germination.

(i) _____

(ii) _____

(iii) _____

(c) State **two** ways in which plants disperse their seeds.

(i) _____

(ii) _____

(20 marks)

Question 2.

(a) State one difference between a compound fertilizer and manure.
In your answer mention **one** point about each.

_____

_____

_____

(b) The photograph shows a bag of compound fertilizer. The numbers on the front represent the major elements in the fertilizer. Name these **three** elements.

(i) _____

(ii) _____

(iii) _____

(c) Other than the fertilizer shown in the photograph above, name another fertilizer used in agriculture.

_____

(20 marks)

Question 3.

State the location of each of the following in the body of a mammal.
The first one has been completed as an example.

Body Part	**Location**
Villi	**Small intestine**
(i) Left ventricle	
(ii) Femur	
(iii) Bronchiole	
(iv) Testis	
(v) Cerebrum	

(20 marks)

[OVER]

Question 4.

Complete the table below in relation to the organisms shown in the photographs.

		
(i) **Name of organism**		
(ii) **Phylum**		
(iii) **One characteristic of a member of the phylum**		
(iv) **Importance in agriculture**		

(20 marks)

Question 5.

Give a definition for each of the following terms used in animal production.

Livestock term	**Definition**
(i) Bullock (or steer)	
(ii) Gilt	
(iii) Draft or cast ewe	
(iv) Broiler	
(v) Suckler calf	

(20 marks)

Question 6.

Give a scientific explanation for **each** of the following practices carried out on tillage farms:

(a) Crop rotation. _____

_____

_____

(b) Sowing certified seed. _____

_____

_____

(c) Applying selective herbicide. _____

_____

_____

(d) Planting winter varieties of cereals. _____

_____

_____

(20 marks)

Question 7.

(a) Name **two** diseases of livestock that are caused by bacteria.

1. _____ 2. _____

(b) Give **two** benefits of bacteria in agriculture.

1. _____

2. _____

(c) Which **type** of organism is the cause of potato blight? _____

(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.

Question 8.

(a) Write a note on **each** of the following practices carried out in sheep production:
- (i) Tail docking
- (ii) Shearing
- (iii) Raddling a ram
- (iv) Dipping
- (v) Walking the flock through a footbath.

(b) Several pieces of equipment and housing units are used to ensure good farm management. Explain the use of **each** of the following on farms involved in livestock production:
- (i) Isolation pen
- (ii) Infrared lamp
- (iii) Creep feeder
- (iv) Crush
- (v) Farrowing crate.

(60 marks)

Question 9.

(a) Clover and perennial ryegrass are often used in seed mixtures for grazing.
- (i) State **three** advantages of using clover in seed mixtures.
- (ii) Give **two** reasons why perennial ryegrass is considered to be a superior grass.

(b) Farmers often sow a mixture of seed varieties in their leys. The seeds germinate and undergo establishment even though the varieties have different heading out dates. Explain the **three** underlined terms.

(c) Different methods may be used when sowing grass seed.
State the most suitable method of sowing grass seed in **each** of the following situations:
- (i) A farmer wants to plant barley but also to have grass available for grazing when the barley is harvested.
- (ii) A farmer wants to sow grass seed on land which is shallow or not easily ploughed.

(d)
- (i) What does the term *Dry Matter Digestibility* (*DMD*) mean?
- (ii) What approximate DMD value should high quality silage be?
- (iii) Explain why old, poorly managed grassland is unsuitable for the production of good-quality silage.

(60 marks)

Question 10.

(a) Read the following paragraph on the formation of peat bogs and match the words **from the list below** with the numbered spaces.

waterlogging **1-2m** **8-10m** **evaporation** **rainfall** **acidity**

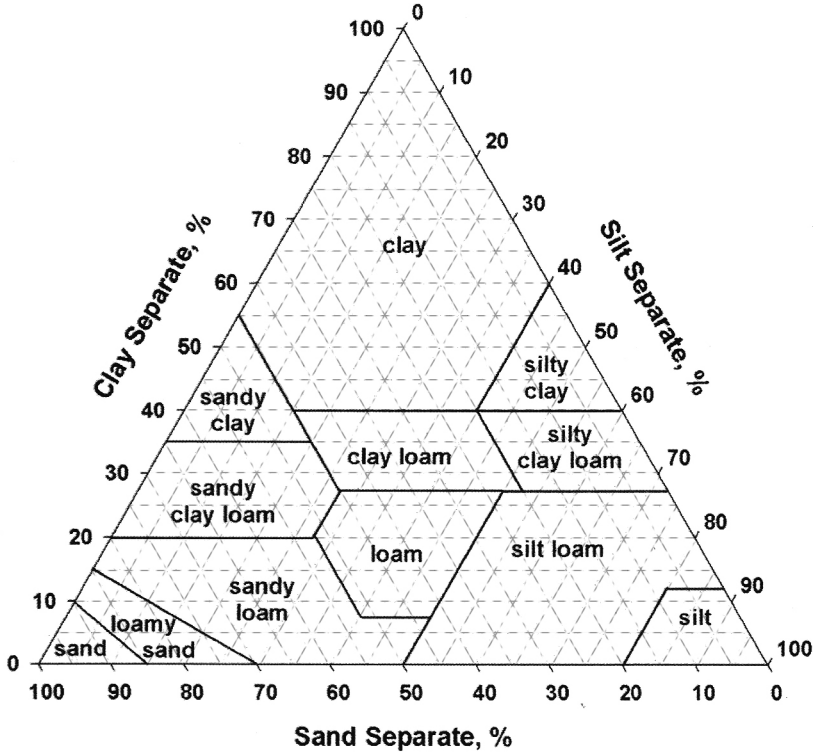
Write your answers in your answer book and not on this examination paper.

Blanket peats are formed in areas of high _____**1**_____ and low _____**2**_____. They are normally _____**3**_____ in depth. _____**4**_____ is a common characteristic of blanket peat. Basin peats are normally _____**5**_____ in depth. They are formed in valleys and depressions as a result of _____**6**_____.

(b) Give an example of (i) an igneous rock
(ii) a sedimentary rock
(iii) a metamorphic rock.
In **each** case, mention an area or county on the island of Ireland where it is commonly found.

(c) Parent rock material may be weathered by physical or chemical means. Weathering breaks rock into soil particles. Give **details** of any **three** ways in which rock can be weathered.

(d) The diagram below shows a soil texture triangle.



Soil Samples	Sand %	Silt %	Clay %
Soil A	10	35	55
Soil B	40	45	15
Soil C	60	25	15

Use the soil texture triangle to identify the textures of soil samples A, B and C listed in the table above. **Write your answers in your answer book.** **(60 marks)**

[OVER]

Question 11.

(a) Parasites are a common occurrence in agriculture.
- (i) What is a parasite?
- (ii) Give an example of a parasite of a **named** crop **or** livestock that you have studied.
- (iii) State **one** way to get rid of the parasite you have named.

(b) With the aid of a labelled diagram, describe the life cycle of a **named** insect.

(c) Describe the cultivation of a cereal **or** a root crop under the following headings:
- (i) Soil suitability
- (ii) Sowing – date **and** method
- (iii) Fertilizer used
- (iv) Control of pests
- (v) Harvesting – method **and** time
- (vi) Yield per hectare.

(60 marks)

Question 12.

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

(a) Draw a labelled diagram of the digestive system of a **named** monogastric animal. Describe an experiment to investigate the action of one **named** digestive enzyme.

(b) Give a scientific explanation for **each** of the following:
- (i) The appearance of earthworms on the surface of a soil following heavy rain.
- (ii) The feeding of colostrum to a calf in the hours immediately after birth.
- (iii) The conservation of hedgerows.
- (iv) The proper storage of hay immediately after drying.
- (v) The thinning of trees in forest tree production.

(c) Milk is considered to be a basic food requirement for young calves.
- (i) State the average composition of fresh milk.
- (ii) Describe a laboratory investigation to show the presence of **one named** component of fresh milk.
- (iii) How can the dairy farmer prevent contamination of milk in the milking parlour?

(d)
- (i) Describe, with the aid of a labelled diagram, a simple food chain as it occurs on a farm.
- (ii) Describe a field investigation to determine the botanical composition of an old permanent pasture.
- (iii) 2010 was designated by the United Nations as the International Year of Biodiversity. Explain the term *biodiversity*.

Question 13.

(a) Explain the following terms: (i) Alleles, (ii) Clone, (iii) Hybrid vigour.

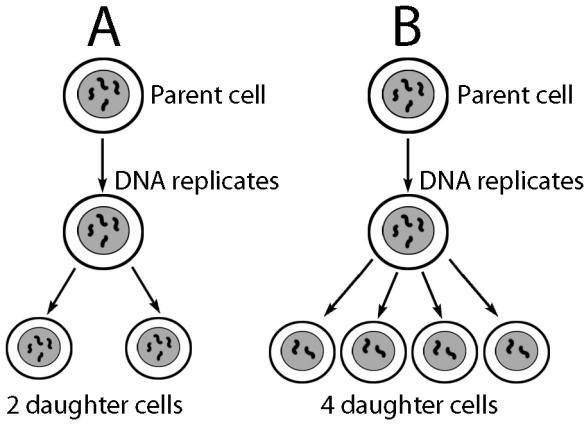
(b) In barley the allele for six-row ear type (**S**) is dominant over the allele for two-row ear type (**s**). A barley plant, homozygous for six-row ear type (**SS**), is crossed with a plant homozygous for two-row ear type (**ss**). The offspring (F1) were heterozygous. The offspring were then crossed with each other by self pollination to produce the F2 generation. **Copy the following into your answer book** and complete the spaces (genotypes in brackets, phenotypes on lines).

The genotypes of the original parents	(SS)	X	(ss)
The gametes produced by each plant	( )	X	( )
The genotype of the offspring (F1)	( )		
The phenotype of the offspring (F1)	_____		

The genotype of the second generation parents	( )		X	( )	
The gametes produced by each parent	( )	( )	X	( )	( )
The genotypes of the second generation (F2)	( )	( )		( )	( )
The phenotypes of the second generation (F2)	_____	_____		_____	_____

(c) **In your answer book** show a cross between a two-row ear type parent and an F1 individual from the example above.
In your cross show:
(i) the genotypes of the parents
(ii) the genotypes of the gametes
(iii) the genotypes **and** the phenotypes of the offspring of the cross.

(d) Mitosis and meiosis are two types of cell division on your course which are presented below in diagrammatic form



(i) Which diagram, A or B, represents meiosis?

(ii) Which diagram has haploid cells?

(iii) What is the main difference between a haploid cell and a diploid cell?

(iv) Where in an animal's body would you expect to find haploid cells?

(60 marks)

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