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, 2017

AGRICULTURAL SCIENCE – ORDINARY LEVEL

THURSDAY, 22 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.

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SECTION ONE (120 marks)

Instructions

Write your examination number in the space provided on page 1.

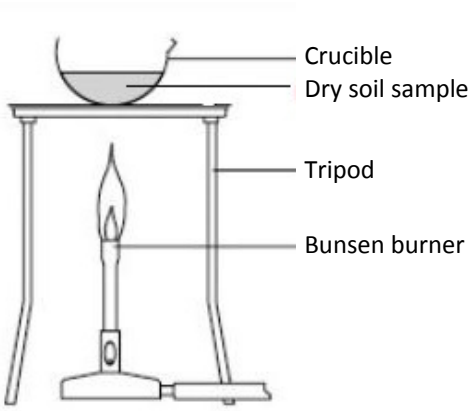
Answer **six** questions. Each question carries **20** marks.

Write your answers in the spaces provided.

Keep your answers short.

Question 1.

(a) The diagram shows a soil sample being burned to find the percentage (%) organic matter in it.



(i) Why was a dry soil sample used?

_____

(ii) How would a student know when all the organic matter has been removed from the soil?

_____

(b) (i) State **two** reasons why organic matter is important in a soil.

1. _____

2. _____

(ii) State **two** ways that organic matter may be added to a soil.

1. _____

2. _____

(iii) Name **two** components of soil other than organic matter.

1. _____

2. _____

[OVER]

Question 2.

The following images show equipment/machinery used on farms.

In the table identify **and** state the main use for **each** item.

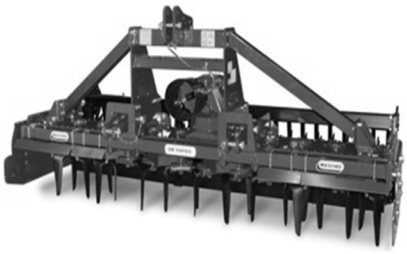
Item A is completed as an example.

A

B

C

D



E

F

Machine/equipment	Letter	Main use
Cattle crush	**A**	To control animals for testing or dosing
Power harrow		
Combine harvester		
Bale wrapper		
Crop sprayer		
Slurry tank		

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: **Basalt is an igneous rock**		**(T)**	**F**
(a)	The diaphragm separates the chest from the abdomen in mammals.	T	F
(b)	Hay helps to develop the rumen in calves.	T	F
(c)	The length of gestation in cows is seven months.	T	F
(d)	Landrace is a breed of sheep.	T	F
(e)	Animal gametes are produced as a result of meiosis.	T	F
(f)	Vaccination provides immunity.	T	F
(g)	Peas belong to the plant family *Leguminosae (Fabaceae).*	T	F
(h)	The dry matter digestibility (DMD) of good quality silage is 50%.	T	F
(i)	Grass is a dicot plant.	T	F
(j)	The plumule of a seed develops into the stem.	T	F

Question 4.

Diseases of farm animals may be caused by viruses, bacteria, fungi or by a deficiency (of a vitamin or a mineral) in their diet.

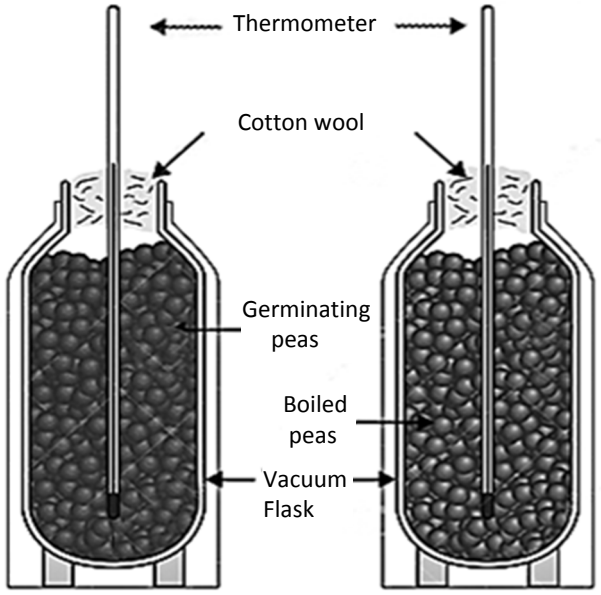
In the table below indicate the cause of **each** of the diseases listed.
The cause of foot rot is completed as an example.

Disease	Cause
Foot rot	Bacteria
Swayback in lambs	
Foot and mouth disease	
Milk fever in cows	
Ringworm	
Tuberculosis (TB)	

[OVER]

Question 5.

The diagram shows the apparatus used in an investigation on seed germination.



(a) What aspect of seed germination is being investigated?

_____

(b) What change, if any, would you expect to find in the temperature inside each flask after 5 days?

Flask A. _____

Flask B. _____

(c) Why was the inside of each flask sterilised at the beginning of the investigation?

_____

(d) State the **three** conditions necessary for seed germination.

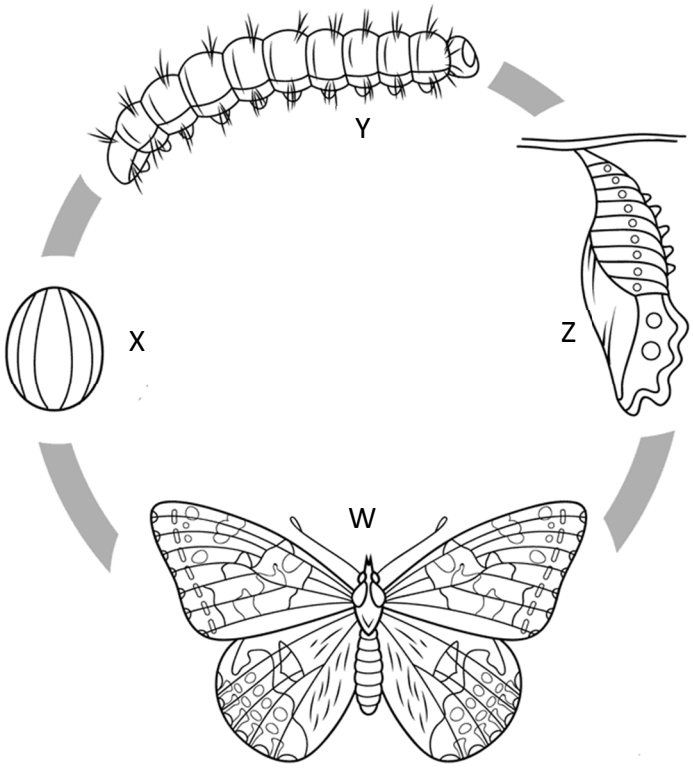
(i) _____

(ii) _____

(iii) _____

Question 6.

The diagram shows the stages of complete metamorphosis in the life cycle of the cabbage white butterfly.



(a) Name the stages labelled W, X, Y, Z.

W. _____

X. _____

Y. _____

Z. _____

(b) (i) State the different feeding methods of stage W and of stage Y.

W. _____

Y. _____

(ii) State the agricultural importance of stage W and of stage Y.

W. _____

Y. _____

(c) Name **one** other insect **and** state its agricultural importance.

Insect. _____

Importance. _____

[OVER]

Question 7.

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

(a) Growing shelter belts.

_____

_____

_____

(b) Keeping milk at approximately 4 ^{o}C in a bulk tank.

_____

_____

_____

(c) Tagging young animals.

_____

_____

_____

(d) Spreading ground limestone.

_____

_____

_____

(e) Injecting bonhams (piglets) with an iron solution.

_____

_____

_____

SECTION TWO (180 MARKS)

Instructions

Write your answers to Section Two into your answer book.

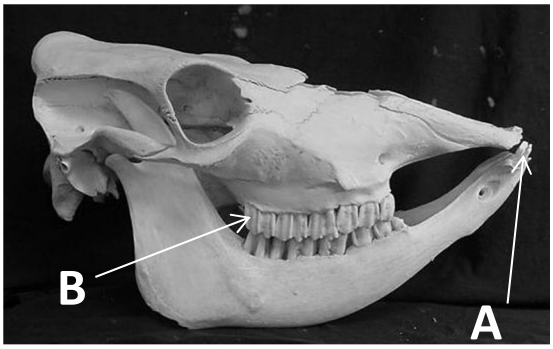
Answer any **three** questions. Each question carries **60** marks.

Question 8.

(a) (i) State **three** functions of the cow's skeleton.

(ii) Name **one** mineral **and one** vitamin necessary for proper bone development.

(b) The photograph shows a cow's skull.



(i) Name the types of tooth labelled A and B.

(ii) State the function of A **and** the function of B.

(c) (i) Name any **two** chambers of the cow's stomach.

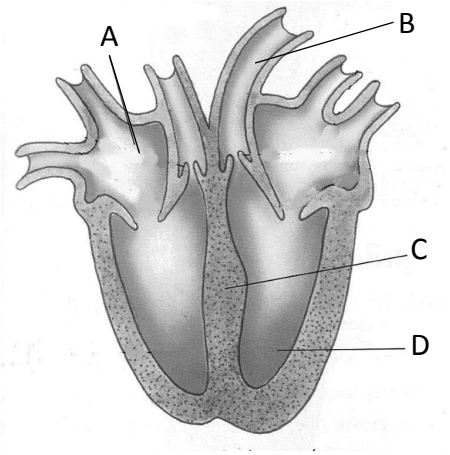
(ii) State the function of **each** of the chambers referred to in (i).

(d) The diagram shows a section through a cow's heart.

(i) Name **each** of the parts labelled A, B, C, D.

(ii) State the function of part C.

(iii) State the location of the heart in the cow's body.



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Question 9.

(a) Explain the following terms used in genetics.

(i) Haploid

(ii) Homozygous

(iii) Locus.

(b) The pure-breeding barley variety Alpha (AA) has a straw length of 800 mm.
The pure-breeding barley variety Beta (BB) has a straw length of 600 mm.
A cross between these two varieties results in a hybrid with a straw length of 700 mm.

(i) What does this show about the genes that control straw length in this example?

(ii) **Copy and complete the following in your answer book** to show the cross between the Alpha and Beta varieties of barley.

Parents: Pure-breeding Alpha X Pure-breeding Beta

Genotypes of parents: ( ) X ( )

Gametes: ( ) X ( )

Genotype of offspring: ( )

Phenotype of hybrid offspring: _____

(iii) The hybrid plants were allowed to self-pollinate and the resulting seeds were sown.

Copy and complete the following in your answer book, using the above hybrids as parents.

Genotype of parents: ( ) X ( )

Gametes: ( ) ( ) X ( ) ( )

Genotypes of offspring: ( ) ( ) ( )

Phenotypes of offspring: _____ _____ _____

(c) (i) State **one** advantage of using artificial insemination (AI) on a dairy farm.

(ii) State **one** disadvantage of using AI on a dairy farm.

Question 10.

(a) The pictures show two plants that could be used when reseeding a pasture.

A

B

(i) Name the grass variety in picture A.

(ii) Give **two** reasons why a farmer would use this grass when reseeding.

(iii) Name the plant in picture B.

(iv) Give **two** reasons why plant B would be used in a seed mixture.

(b) (i) Give **one** reason why weeds should be controlled in grassland.

(ii) State **two** ways of controlling weeds in grassland, other than using herbicide (weedkiller).

(c) Describe strip grazing, with the aid of a labelled diagram.

(d) Describe an experiment to find the percentage (%) sugar in a sample of grass.

Question 11.

(a) (i) Explain how an iron pan is formed in a soil.

(ii) What are the effects of an iron pan in a soil?

(iii) Name the soil group in which an iron pan is most likely to form.

(iv) How can an iron pan in a soil be removed?

(b) Describe the method of taking soil samples for testing.

(c) Describe a method to measure the pH of a soil sample.

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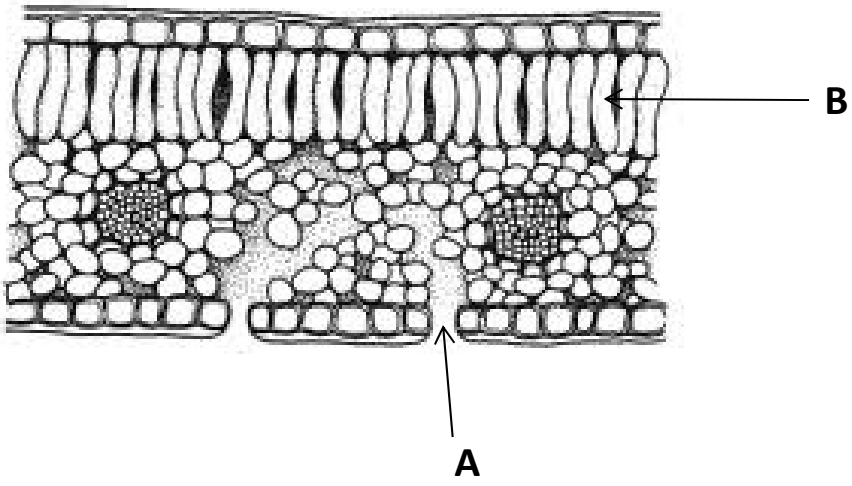
Question 12.

(a) The diagram shows a section of a leaf.



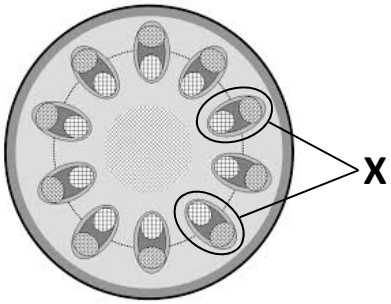
(i) Name the feature labelled A.

(ii) State **two** functions of A.

(iii) What is the main function of the cells labelled B?

(iv) State **two** ways in which the structure of a leaf is suited to its main role.

(b) The diagram shows a cross section of a plant stem.



(i) Name a type of plant that would have a stem cross section like this.

(ii) Name the structures labelled X.

(iii) State **two** functions of X.

(iv) Name a plant that has a modified stem.

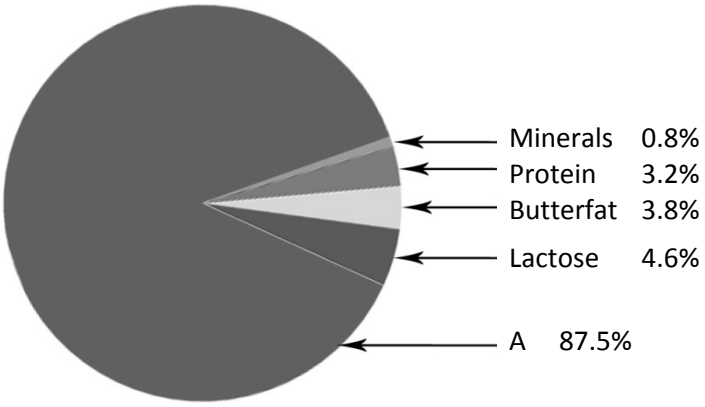
(c) Describe an experiment to show phototropism in seedlings.

Question 13.

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

(a) The pie-chart shows the approximate composition of cows' milk.

Composition of milk



(i) What component of milk is represented by the part labelled A?
(ii) What is colostrum?
(iii) Give any **two** differences between colostrum and ordinary milk.
(iv) Give **two** ways a farmer could improve the quality of the milk from his herd.
(v) Why is the milk from a cow treated for mastitis not allowed into the human food supply?
(vi) Give **one** reasons for culling cows on a dairy farm.
(vii) What is meant by the term *dual purpose breed*?
(viii) Give **one** example of a dual purpose breed.

(b) Describe the cultivation of barley under the following headings.

(i) Soil type
(ii) Sowing time
(iii) Sowing method
(iv) Weed control
(v) Disease control
(vi) Harvesting.

(c) Farmers have to be aware of the possibility of causing pollution while working on the farm.

(i) What is meant by the term *pollution*?
(ii) In **each** of the following state **two** ways that a farmer can reduce the risk of causing pollution:
1. When making silage
2. On a dairy farm
3. When spreading artificial fertiliser
4. When using insecticides or fungicides.

(d) Comment on each of the following in relation to weanlings, from first winter housing until they are put out on grass the following spring.

(i) Housing
(ii) Diet
(iii) Control of disease and parasites
(iv) Target weight at turnout
(v) Compensatory growth.

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