



Coimisiún na Scrúduithe Stáit  
State Examinations Commission

Leaving Certificate Examination 2026  
**Agricultural Science**  
Ordinary Level

Monday 15 June Afternoon 2:00 - 4:30

300 marks

Examination Number

|                      |                      |                      |                      |                      |                      |
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Date of Birth

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For example, 3rd February  
2005 is entered as 03 02 05

Centre Stamp

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## Instructions

There are **two** sections to this examination.

It is recommended that you spend about 50 minutes on Section **A** and 100 minutes on Section **B**.

**Section A**      Answer **ten** questions from this section. There is internal choice in **four** questions.  
Each question carries 10 marks.

**Section B**      Answer any **four** questions from this section. There is internal choice in **two** questions.  
Each question carries 50 marks.

Write your Examination Number and your Date of Birth in the boxes on the front cover.

Write your answers in blue or black pen. You may use pencil for sketches, graphs and diagrams only.

Write your answers in the spaces provided to all parts of the examination into this answerbook.

This answerbook will be scanned and your work will be presented to an examiner on screen.  
Anything that you write outside of the answer areas may not be seen by the examiner. You are not required to use all the space provided.

There is extra space at the end of Section **A** and at the back of the booklet. Label any extra work clearly with the question number and part.

## Section A

100 marks

Answer any **ten** questions.  
Each question carries 10 marks.

### Question 1

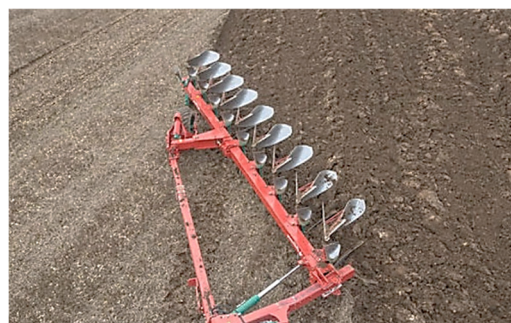
- (a) Identify **any three** pieces of equipment commonly found on Irish farms using the words in the list below.

|        |              |                   |               |
|--------|--------------|-------------------|---------------|
| Plough | Grass topper | Combine harvester | Drone sprayer |
|--------|--------------|-------------------|---------------|

**A**



**B**



|  |  |
|--|--|
|  |  |
|--|--|

**C**



**D**



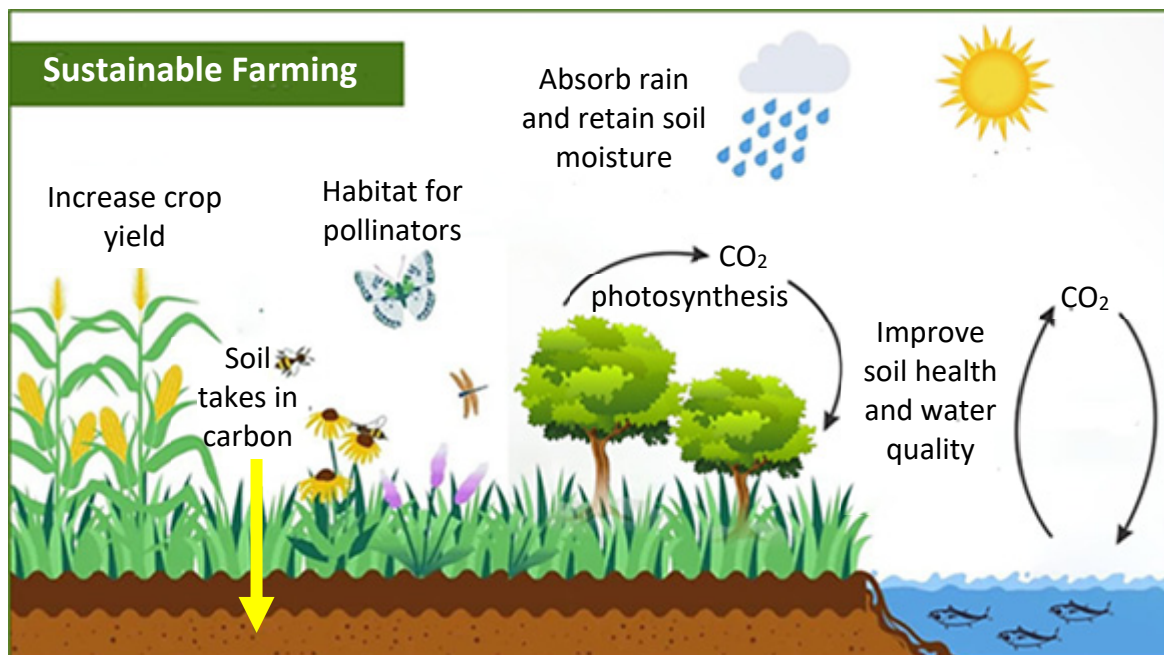
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- (b) Outline **one** safety precaution farmers must take when using the piece of machinery in picture **C** in part (a) above.

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## Question 2

Sustainable farming is very important for Irish farmers.  
Analyse the picture and answer the questions that follow.



- (a) Identify how sustainable farming improves water quality, by placing a tick (✓) in the correct box.

|                                  |  |
|----------------------------------|--|
| Reduces soil erosion and run off |  |
| Reduces soil organic matter      |  |

- (b) Outline **one** way sustainable farming can increase the yield of crops.

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- (c) Outline **two** ways farmers can provide habitats for pollinators on their farms.

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| 1. |
|    |
| 2. |
|    |

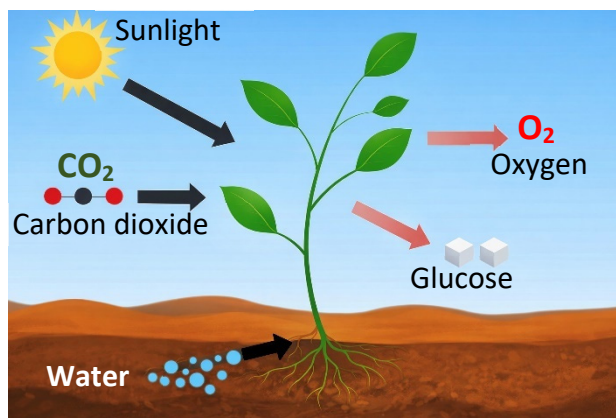
### Question 3

Answer **either** (a) **or** (b).

- (a) The diagram shows photosynthesis in plants. Analyse the diagram and answer the questions that follow.

- (i) Identify **one** input (requirement) and **one** output (product) in the process of photosynthesis.

|         |
|---------|
| Input:  |
| Output: |



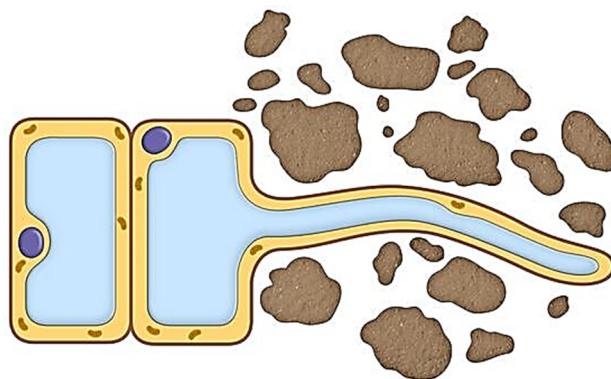
- (ii) List **two** ways farmers use their knowledge of photosynthesis to improve crop yields.

|    |
|----|
| 1. |
|    |
| 2. |
|    |

Or

- (b) Study the diagram of the plant root.

- (i) Identify the presence of the root hair by placing an **R** on its location in the diagram.



- (ii) State **one** important mineral that plants take in through their roots.

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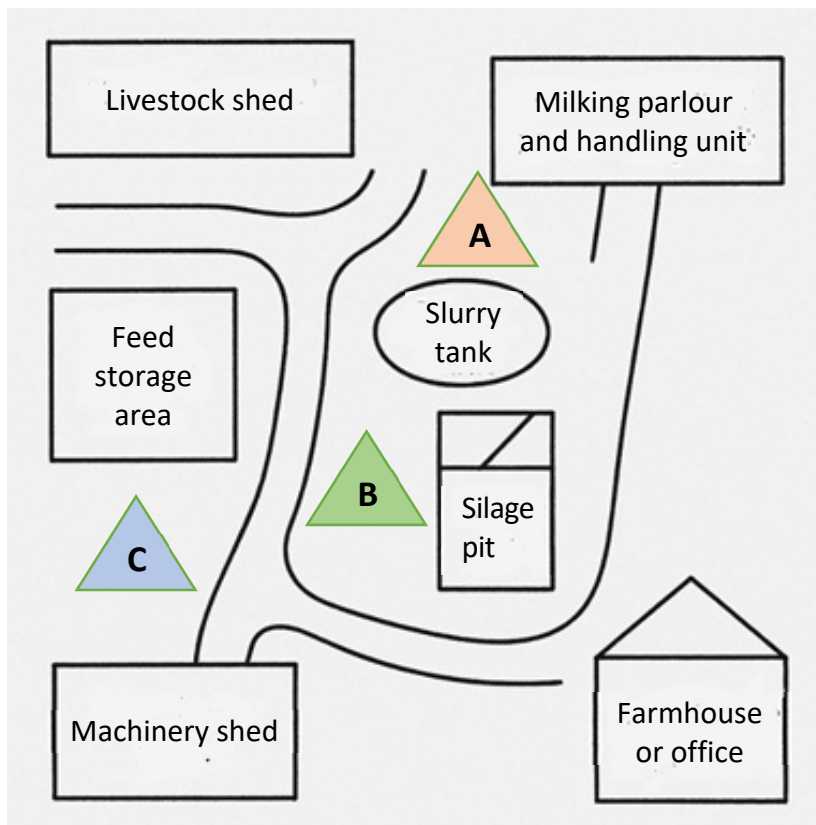
- (iii) A farmer notices that plants are not growing well, even though the soil looks healthy. Identify **two** possible reasons why nutrients might not be reaching the plant roots properly by placing ticks (✓) in the correct boxes.

|                                 |  |
|---------------------------------|--|
| Soil is free draining           |  |
| Soil is too compacted           |  |
| Soil has lots of organic matter |  |
| Incorrect pH                    |  |

#### Question 4

The map below is a hand sketch drawn by an Agricultural Science student on a farm visit. The student identified three potential hazards on the farm and labelled them **A**, **B** and **C**. Analyse the sketch and answer the questions that follow.

(a) Identify **any two** potential safety hazards labelled **A**, **B** and **C**.



|    |
|----|
| 1. |
| 2. |

(b) For **any one** safety hazard identified in part (a), suggest **one** measure the farmer could take to reduce the potential risk.

| Safety hazard | Way to reduce potential risk |
|---------------|------------------------------|
|               |                              |
|               |                              |

(c) Explain why it is important to separate animal movement areas from machinery routes in a farmyard.

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### Question 5

(a) Identify **any three** cattle breeds found on Irish farms using the list of words below.

|           |                |          |           |
|-----------|----------------|----------|-----------|
| Simmental | Aberdeen Angus | Friesian | Shorthorn |
|-----------|----------------|----------|-----------|

**A**



**B**





**C**



**D**





(b) Identify which animal **A**, **B**, **C** or **D** in part (a) above has a roan colour, by placing a tick (✓) in the correct box.

|          |  |
|----------|--|
| <b>A</b> |  |
| <b>B</b> |  |
| <b>C</b> |  |
| <b>D</b> |  |

### Question 6

Organic farming is becoming more popular in Ireland as consumers look for food that is produced in a more natural and environmentally friendly way.

In relation to organic farming, indicate if the following are true or false by placing a tick (✓) in the correct box.



*The first one has been done as an example.*

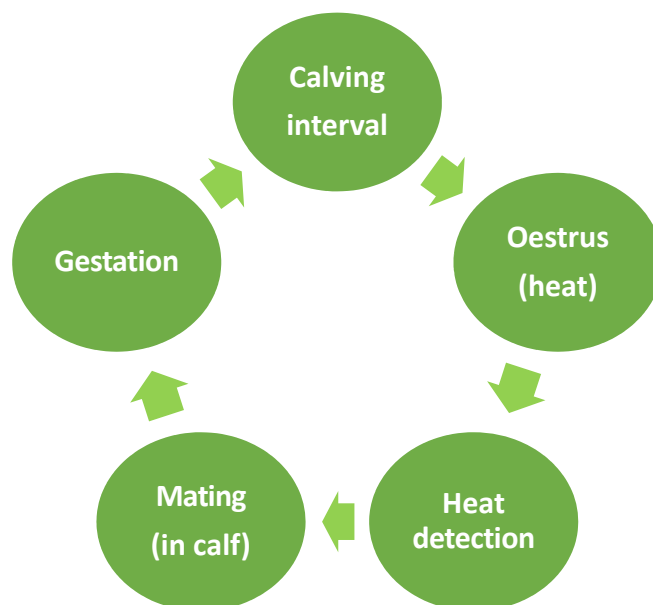
|                |                                                              | True                                | False                    |
|----------------|--------------------------------------------------------------|-------------------------------------|--------------------------|
| <b>Example</b> | <b>Calves must be penned in groups after one week of age</b> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| <b>(i)</b>     | The use of synthetic chemical fertilisers is not allowed     | <input type="checkbox"/>            | <input type="checkbox"/> |
| <b>(ii)</b>    | Reduces the number of pollinators                            | <input type="checkbox"/>            | <input type="checkbox"/> |
| <b>(iii)</b>   | Aims to improve soil health                                  | <input type="checkbox"/>            | <input type="checkbox"/> |
| <b>(iv)</b>    | Crop rotation is a common practice                           | <input type="checkbox"/>            | <input type="checkbox"/> |
| <b>(v)</b>     | Genetically modified organisms (GMOs) are allowed            | <input type="checkbox"/>            | <input type="checkbox"/> |

### Question 7

Complete the breeding cycle of a dairy cow only using the number of days in the following list.

| Number of days | 283 | 365 | 21 | 45 |
|----------------|-----|-----|----|----|
|----------------|-----|-----|----|----|

| Stage                                    | Number of days |
|------------------------------------------|----------------|
| Calving interval<br>(calving to calving) |                |
| Oestrus<br>(heat)                        |                |
| Mating<br>(in calf)                      |                |
| Mating to calving<br>(gestation)         |                |



**Question 8**Answer **either** (a) **or** (b).

- (a) Healthy soils are full of biological activity. Living organisms play a key role in maintaining soil fertility and supporting plant growth.

- (i) Name **two** types of living organisms commonly found in soil.

|    |
|----|
| 1. |
| 2. |



- (ii) Explain **two** benefits that soil organisms provide for crops or pasture.

|    |
|----|
| 1. |
|    |
| 2. |
|    |

Or

- (b) A student carried out an investigation to determine the pH of the soil and used the following equipment.

Deionised water, pH meter or pH paper, filter paper, soil sample, glass rod



- (i) Outline the use of the glass rod in this investigation.

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- (ii) Why did the student use the filter paper?

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- (iii) Describe how the student used the pH meter or pH paper.

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**Question 9**Answer **either** (a) **or** (b).

The 2022 Teagasc National Farm Survey states that over 50% of all farming accidents involved livestock, with incidents involving calving cows being the most common. Entering a pen with a cow and calf can be very dangerous.



- (a) Some safety features to prevent injury during the calving season are outlined in the table below.

Outline **one** reason for **any three** safety features.

| Safety feature                                                     | Reason |
|--------------------------------------------------------------------|--------|
| Lock cows in a proper calving gate                                 |        |
|                                                                    |        |
|                                                                    |        |
| Good handling facilities when moving cows to and from calving pens |        |
|                                                                    |        |
|                                                                    |        |
| Have two escape points in a calving pen                            |        |
|                                                                    |        |
|                                                                    |        |
| Never turn your back on a freshly calved cow                       |        |
|                                                                    |        |
|                                                                    |        |
| Keep dogs/children away from calving shed                          |        |
|                                                                    |        |
|                                                                    |        |

Or

(b) You are on a farm with a group of farmers and you come across the following signs.



(i) Explain the meaning of **any two** signs A, B or C to the group of farmers.

| Safety sign | Meaning |
|-------------|---------|
| A           |         |
|             |         |
| B           |         |
|             |         |
| C           |         |
|             |         |

(ii) You also notice a sign saying 'biosecurity measures in place' to prevent diseases entering the farm.

Outline **two** biosecurity measures the farmer could put in place on the farm.

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| 1. |
|    |
| 2. |
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### Question 10

- (a) Identify the correct lifecycle for **any two** of the plants below, by placing a tick (✓) in the correct box.



| Barley is a |  |
|-------------|--|
| Annual      |  |
| Biennial    |  |
| Perennial   |  |



| White clover is a |  |
|-------------------|--|
| Annual            |  |
| Biennial          |  |
| Perennial         |  |



| Potato is a |  |
|-------------|--|
| Annual      |  |
| Biennial    |  |
| Perennial   |  |

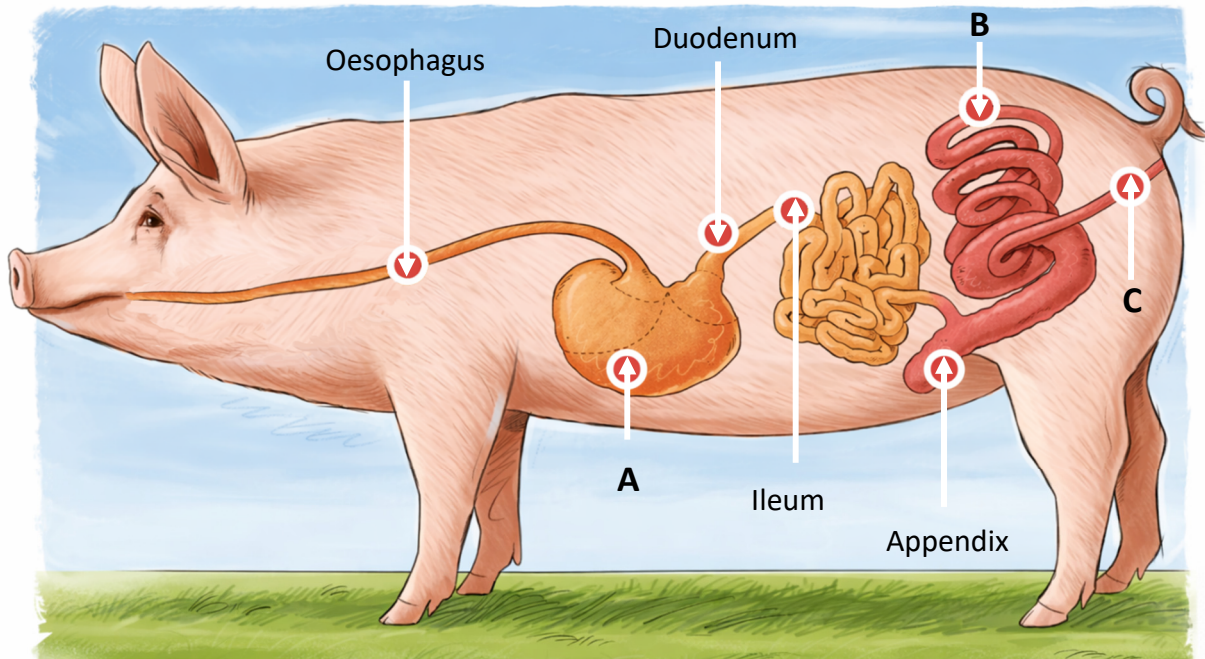
- (b) Explain how a farmer would control weeds in a grass field.

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### Question 11

- (a) The diagram shows the digestive system of a pig.  
Identify if a pig is a ruminant or a monogastric by placing a tick (✓) in the correct box.

|             |  |
|-------------|--|
| Ruminant    |  |
| Monogastric |  |



- (b) Label **A**, **B** and **C** on the diagram using the list of words below.

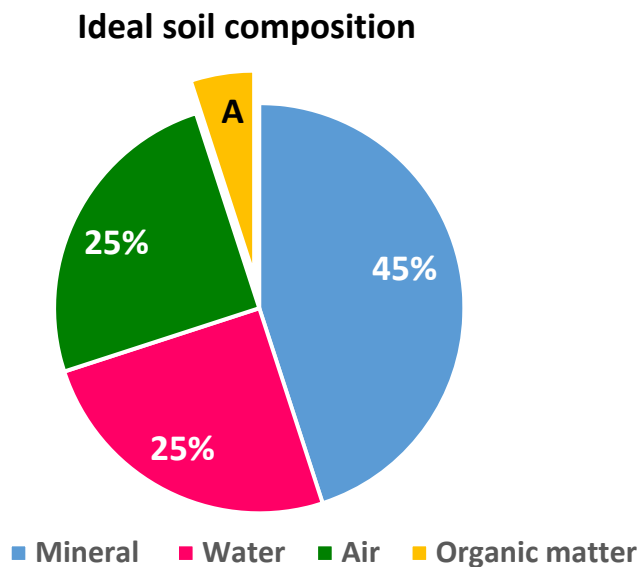
|        |         |       |
|--------|---------|-------|
| rectum | stomach | colon |
|--------|---------|-------|

|    |  |
|----|--|
| A: |  |
| B: |  |
| C: |  |

**Question 12**

Answer **either** (a) **or** (b).

- (a) The chart shows the ideal soil composition for a sample of soil.  
(i) Calculate **A** the % organic matter in the sample of soil.



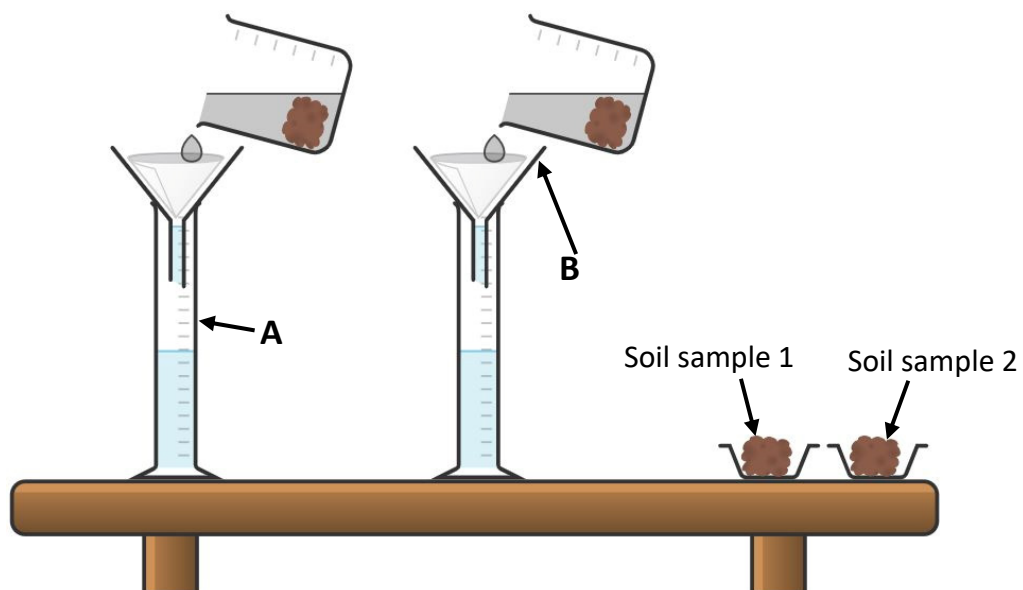
Calculation:

- (ii) An Agricultural Science student wanted to determine the texture of a soil sample they got on a farm walk.  
Using the hand testing method, explain how the student determined the texture of the soil.

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Or

- (b) A student wanted to determine the texture of two soil samples using the sedimentation method. They set up an investigation using the following method.



- (i) Identify the pieces of equipment labelled **A** and **B** in the diagram.

A:

B:

- (ii) Outline **one** reason why water is mixed with the soil at the beginning of the investigation.

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- (iii) Explain how the student could determine the texture of each soil sample.

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|  |

[illegible]



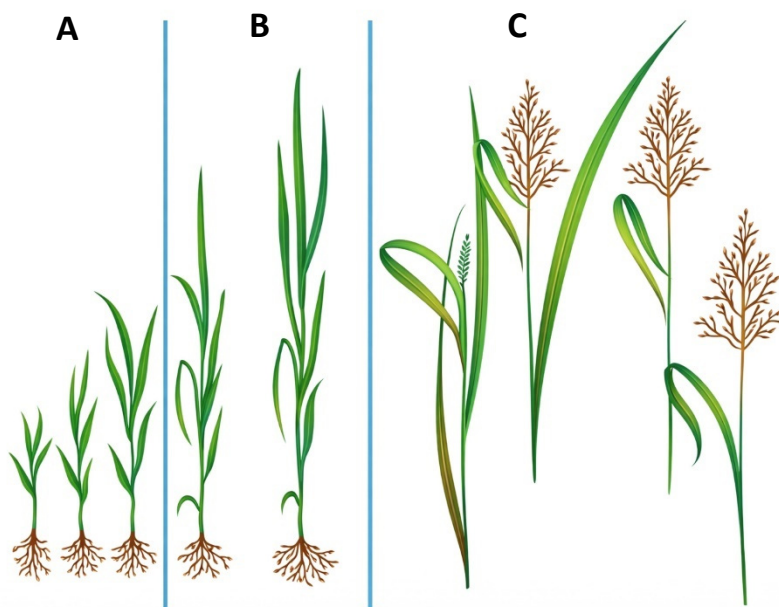
**Section B****200 marks**

Answer any **four** questions.  
Each question carries 50 marks.

**Question 13**

Grass grows in different stages throughout the year. Farmers need to understand these growth stages to manage grazing, silage, and fertiliser properly.

- (a) (i) Identify the **three** stages **A**, **B** and **C** in the growth cycle of a grass plant using the list of words in the table.



|              |
|--------------|
| Elongation   |
| Reproductive |
| Vegetative   |

|    |
|----|
| A: |
| B: |
| C: |

- (ii) Identify which stage **A**, **B** or **C** is the best stage for cutting grass for silage.

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(iii) Outline **one** reason for your answer in part (ii).

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(iv) State **two** factors that affect how grass grows.

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|----|
| 1. |
|    |
| 2. |
|    |

- (b) (i) A farmer wants to produce good quality silage.  
Place the following steps 1 to 5 in the correct order, to outline the production of good quality silage. Step 1 has been completed for you.

| Number | Steps in silage production   |
|--------|------------------------------|
|        | Mow the grass                |
|        | Roll grass in pit to compact |
| 1      | <i>Fertilise the field</i>   |
|        | Cover the pit                |
|        | Wilt for 24 hours            |

- (ii) Identify **two** tests that determine the quality of silage by placing ticks (✓) in the correct **two** boxes.

| Tests to determine silage quality |  |
|-----------------------------------|--|
| pH                                |  |
| Total bacterial count             |  |
| Colour                            |  |
| Sedimentation                     |  |

- (c) (i) Another test to determine the grass quality is to measure the dry matter (DM). A student carried out this test and took the photographs below of the steps. Complete the table below by placing the photographs (A, B, C and D) in the correct order of how the student carried out this investigation.

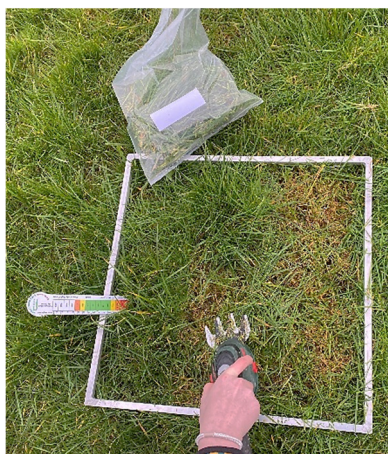
A



B



C



D



| 1 <sup>st</sup> step | 2 <sup>nd</sup> step | 3 <sup>rd</sup> step | 4 <sup>th</sup> step |
|----------------------|----------------------|----------------------|----------------------|
|                      |                      |                      |                      |

- (ii) Outline **two** benefits of measuring grass on farms.

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| 1. |
|    |
| 2. |
|    |

### Question 14

Sally and Jess are sheep farmers in Co. Mayo with a mixture of lowland and hill sheep.

(a) (i) Identify **any three** sheep breeds found on their farm using the list below.

|         |       |                  |                    |
|---------|-------|------------------|--------------------|
| Suffolk | Texel | Border Leicester | Blackface mountain |
|---------|-------|------------------|--------------------|

**A**



**B**



**C**



**D**



|    |
|----|
| A: |
| B: |
| C: |
| D: |

(ii) Identify **one** breed from part (i) that is most suitable for their hill flock.

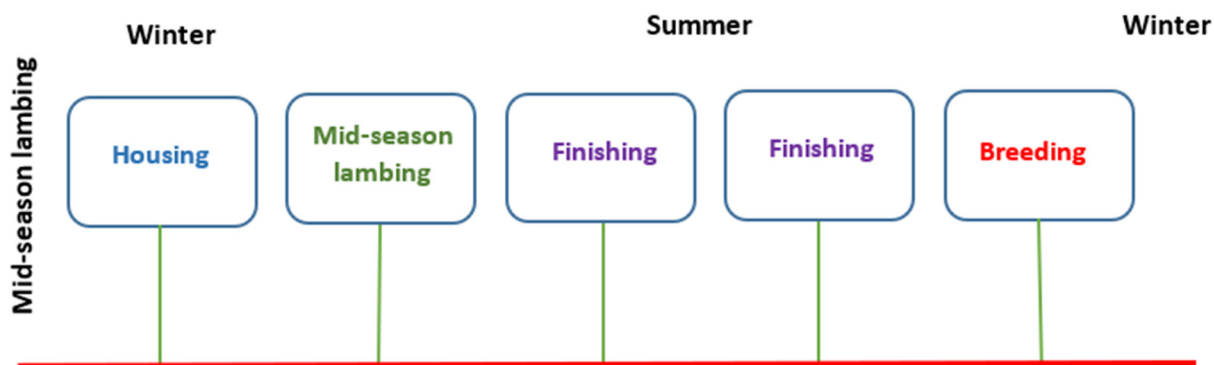
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(iii) Rams **A** and **D**, are classed as terminal sires.

Explain the underlined term, by placing a tick (✓) in the correct box.

|                                                                    |  |
|--------------------------------------------------------------------|--|
| Male animal used to produce offspring destined for meat production |  |
| Male animal used to produce offspring destined for breeding        |  |

- (b) The diagram shows the production through the seasons on a sheep farm. Analyse the diagram and answer the questions that follow.



- (i) Draw an **X** on the red line on the diagram above to show when weaning occurs.
- (ii) Describe how you manage a pregnant ewe from mating to lambing under the headings:

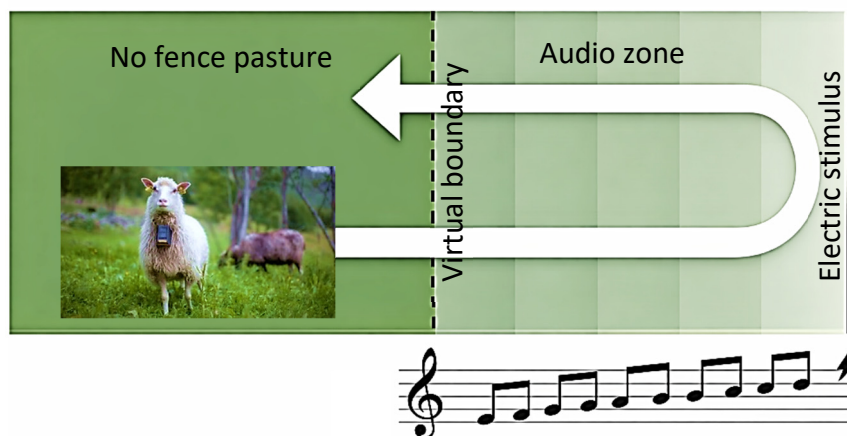
|         |  |
|---------|--|
| Feeding |  |
|         |  |
|         |  |
|         |  |
| Housing |  |
|         |  |
|         |  |
|         |  |
| Health  |  |
|         |  |
|         |  |
|         |  |

- (c) Managing the grazing land for the lowland flock is very different to managing grazing for the hill flock.
- (i) Draw a labelled diagram of a named suitable grazing system that would suit their lowland flock.

Grazing system:

Labelled diagram:

- (ii) Managing the grazing area of the hill flock is very difficult so Jess carried out research on the different ways to manage the sheep. She found new technology called virtual fencing. This technology involves placing a collar on the animal and then you can operate where they can graze from your smart phone.



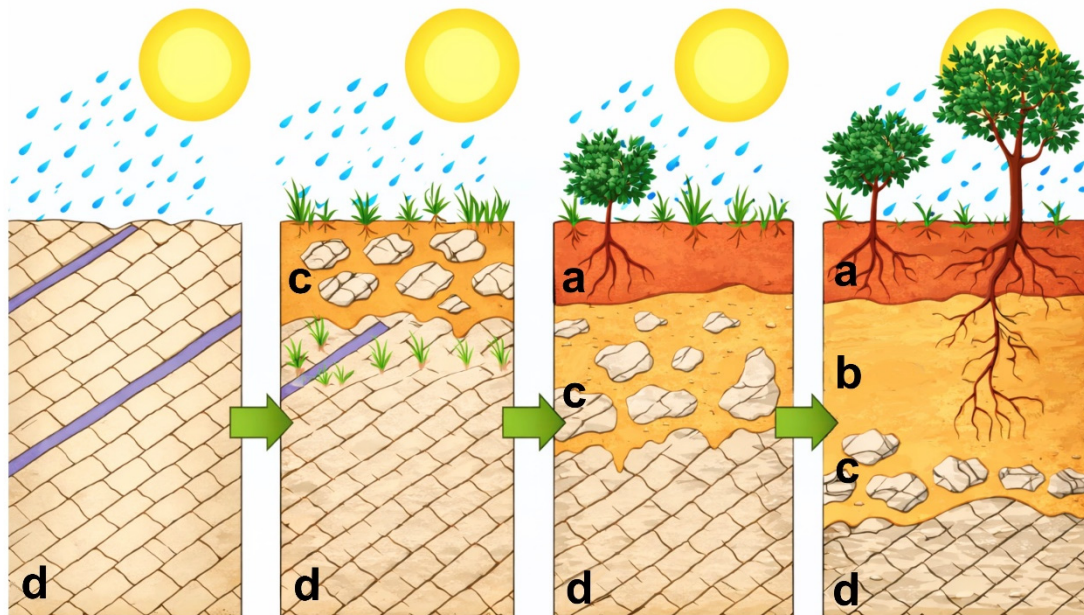
Outline **one** advantage and **one** disadvantage of using this technology.

| Advantage | Disadvantage |
|-----------|--------------|
|           |              |
|           |              |
|           |              |

**Question 15**

Answer both (a) and (b) with **either** (c) or (d).

(a) The diagram below shows how soils are formed over time.



(i) Identify each horizon (a, b, c and d) using the list of words in the table below.

|             |          |         |         |
|-------------|----------|---------|---------|
| Parent rock | Top soil | Subsoil | Bedrock |
|-------------|----------|---------|---------|

|    |
|----|
| a: |
| b: |
| c: |
| d: |

(ii) Using the diagram, explain how soil is formed.

|  |
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(iii) Outline **one** feature of horizon a.

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- (b) Springhill Farm is a mixed farm in County Laois. The farm has dairy cows and tillage, with some grassland fields used for silage.

Recently, the farmer noticed that:

- Cows are poaching the land in wet weather.
- Grass growth is poor in some paddocks.
- Soil tests show low organic matter and poor drainage in certain areas.

The farmer plans to aerate compacted soils and spread farmyard manure after the second silage cut.

- (i) Identify the meaning of the underlined term by placing a tick (✓) in the correct box.

|                                                                                                                    |  |
|--------------------------------------------------------------------------------------------------------------------|--|
| Damage caused to land by prolonged livestock grazing in wet conditions, which creates compacted, waterlogged soils |  |
| Adding nutrients to the soil which may be lost in wet conditions                                                   |  |
| Removing the crop off the land after harvest                                                                       |  |

- (ii) From the case study, name **two** problems the farmer has with the soil.

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|----|
| 1. |
|    |
| 2. |
|    |

- (iii) Explain how compaction can affect grass growth.

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- (iv) Suggest **two** ways that improving soil drainage can benefit both the soil and the dairy cows.

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|----|
| 1. |
|    |
| 2. |
|    |

- (c) Sorcha was researching different methods of slurry spreading to see which one would best suit her farm.  
Identify which machine A **or** B spreads slurry in a more environmentally friendly way and give a reason for your answer.

**A**



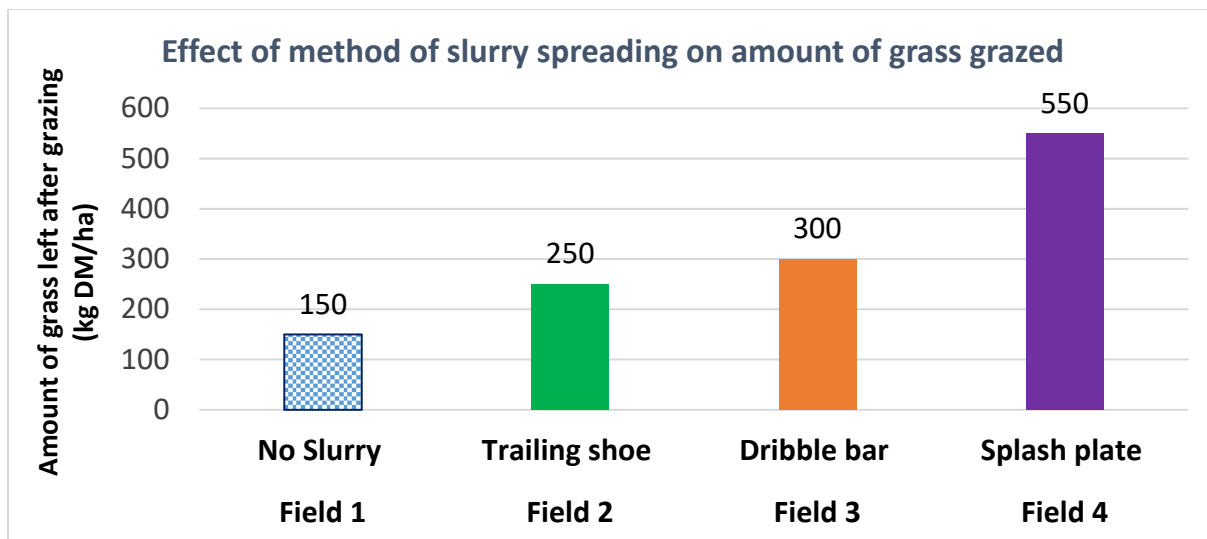
**B**



|                |  |
|----------------|--|
| Machine A or B |  |
| Reason         |  |

**Or**

- (d) Teagasc investigated different methods of slurry spreading. On day 1, they set up the investigation as follows; Field 1 - no slurry. Field 2 - spread using a trailing shoe. Field 3 - spread using a dribble bar. Field 4 - spread using a splash plate. On day 21, cows were introduced and grazed their preferred field. The graph shows the amount of grass left after grazing in each of the four fields. Analyse the graph and answer the questions that follow.



- (i) Explain why Teagasc included a field with no slurry in the investigation.

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- (ii) Identify which **one** of the three methods of slurry spreading did the cows prefer.

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**Question 16**

Answer both (a) **and** (b) with **either** (c) **or** (d).

Aoife was a young beef farmer who purchased 10 three-week-old beef calves to rear to weanling stage.

- (a) (i) Identify the breeds **A** and **B** of calves that she bought using the list below.

|          |                |
|----------|----------------|
| Hereford | Aberdeen Angus |
|----------|----------------|

**A**



**B**



|  |  |
|--|--|
|  |  |
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- (ii) State if these calves are more likely to have come from a dairy or beef farm by placing a tick (✓) in the correct box.

|       |  |
|-------|--|
| Dairy |  |
| Beef  |  |

- (iii) Outline why each calf has its own ear tag with a unique number.

|  |
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- (iv) Aoife bought the calves directly from two different farmers and not through the mart. Outline **two** advantages of buying calves directly.

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|----|
| 1. |
|    |
| 2. |
|    |

- (v) State **two** characteristics Aoife would look for in a calf when buying them.

|    |
|----|
| 1. |
| 2. |

- (b) Aoife had to sort the calves into two pens when they arrived to ensure they reached maximum performance.

(i) Advise Aoife on the best way to sort the calves.

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(ii) Describe the feeding plan for the calves until weaning.

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(iii) Aoife was researching straw bedding and slats as different types of housing for the calves.

**Straw bedding**



**Slats**



Outline **one** advantage of each type of bedding for the calves.

|               |  |
|---------------|--|
| Straw bedding |  |
|               |  |
| Slats         |  |
|               |  |

- |           |  |
|-----------|--|
| Mastitis  |  |
| Scour     |  |
| Pneumonia |  |

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|        |  |
|--------|--|
| 200 kg |  |
| 90 kg  |  |
| 150 kg |  |

- Calculation:

### Question 17

Read the article and answer the questions that follow.

#### Using technology to reduce our carbon footprint

AgNav is a free online tool developed to calculate the carbon footprint and measure sustainability of farms.

Teagasc climate advisers visited a farm to review AgNav figures and put plans in place to further reduce the farm's carbon footprint.

In 2023, the farmer was using 68% protected urea and 32% CAN fertiliser, had all perennial ryegrass swards, and housed his stock for 5.5 months of the year.



(Adapted from Farmers Journal, 2024)

- (a) (i) Identify the meaning of the underlined term by placing a tick (✓) in the correct box.

|                                                                                                       |  |
|-------------------------------------------------------------------------------------------------------|--|
| Fertiliser that protects the grass allowing it to grow                                                |  |
| Fertiliser that can only be spread in early spring                                                    |  |
| Fertiliser that is protected with a urease inhibitor and reduces greenhouse gas emissions and ammonia |  |

- (ii) Outline **two** things farmers could do to further reduce their carbon footprint.

|    |
|----|
| 1. |
|    |
| 2. |
|    |

- (iii) Outline why it is important for farmers to calculate their carbon footprint.

|  |
|--|
|  |
|  |
|  |
|  |

- (b) (i) Complete the table below by placing the following seedbed preparation pictures (A, B, C and D) in correct order for sowing of a crop.

A



B



C



D



|               |  |  |  |  |
|---------------|--|--|--|--|
| Correct order |  |  |  |  |
|---------------|--|--|--|--|

- (ii) Outline **one** safety measure taken when working with any of the machines shown in part (i) above.

|  |
|--|
|  |
|  |
|  |
|  |

- (c) During sowing, the weather was very dry with very little rain. You wanted to investigate if drought conditions had any effect on the germination of the seed.  
Describe with the aid of a labelled diagram how you would carry out this investigation under the following headings:

|                             |  |
|-----------------------------|--|
| <b>Hypothesis</b>           |  |
|                             |  |
| <b>Independent variable</b> |  |
| <b>Dependent variable</b>   |  |
| <b>Control variable</b>     |  |
| <b>Method</b>               |  |
|                             |  |
|                             |  |
|                             |  |
|                             |  |
|                             |  |
|                             |  |
|                             |  |
|                             |  |
|                             |  |
|                             |  |
| <b>Result</b>               |  |
|                             |  |

Labelled diagram:

### Question 18

- (a) Katie and Tom are dairy farmers in Co. Limerick.  
They want to improve the quality of milk on their farm.

- (i) State **two** factors that affect the quality of milk produced on a dairy farm.

|    |
|----|
| 1. |
| 2. |



- (ii) Give **two** practices a farmer should carry out to ensure milk is clean and safe before collection.

|    |
|----|
| 1. |
|    |
| 2. |
|    |

- (iii) Explain why it is important to cool milk quickly after milking.

|  |
|--|
|  |
|  |
|  |

- (iv) Identify which **two** of the following contribute to a high Total Bacterial Count (TBC) in milk, by placing ticks (✓) in the correct boxes.

|                 |  |
|-----------------|--|
| Poor hygiene    |  |
| Udder infection |  |
| Poor nutrition  |  |

- (v) List **two** ways that milk can become contaminated.

|    |
|----|
| 1. |
|    |
| 2. |
|    |

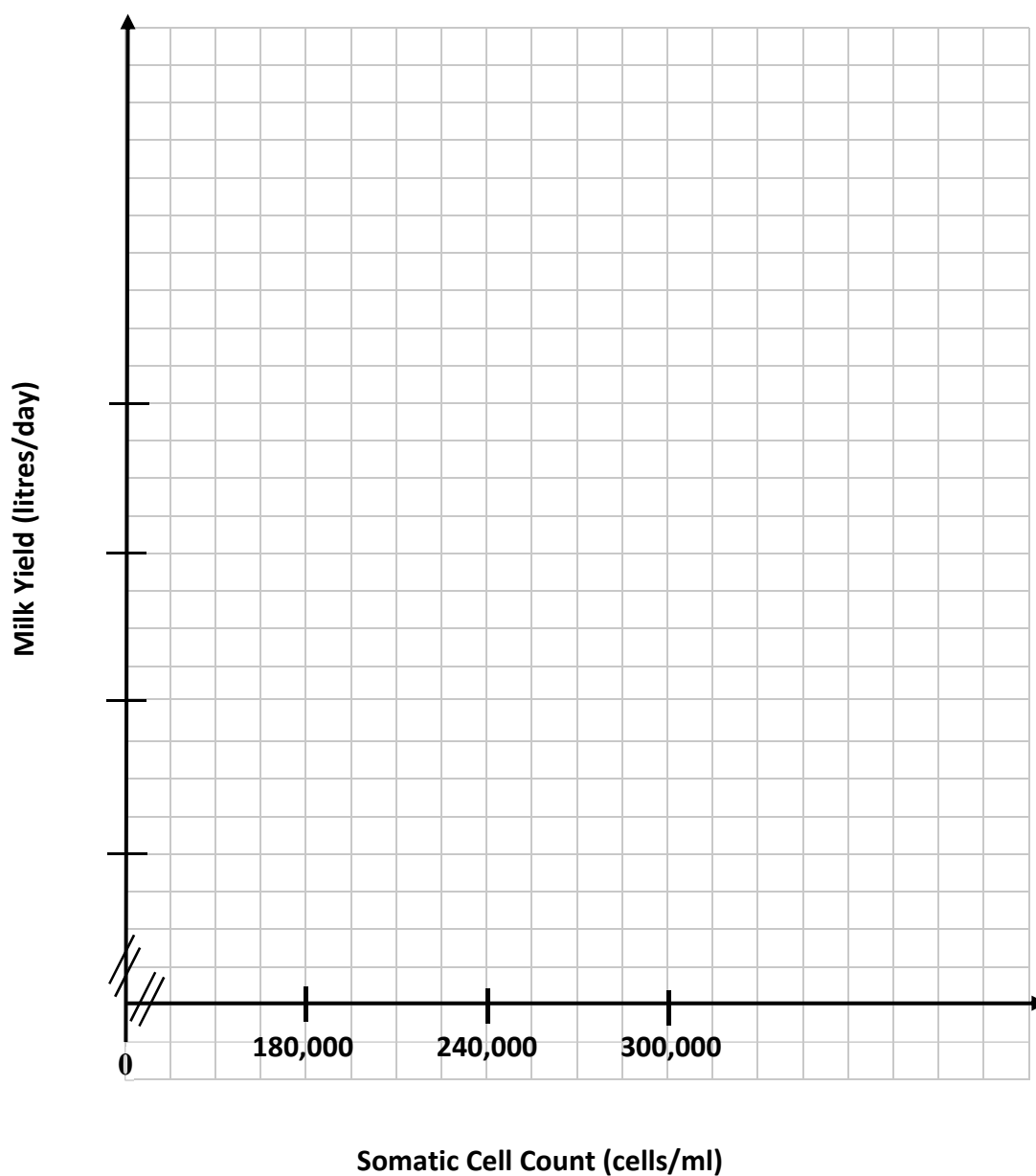
- (b) Katie and Tom monitored milk yield and somatic cell count (SCC) over three months to check herd health. The results were recorded and are presented in the table below. Analyse the results and answer the questions that follow.

| Month | Somatic Cell Count (SCC) (cells/ml) | Milk Yield (litres/day) |
|-------|-------------------------------------|-------------------------|
| April | 180,000                             | 1,200                   |
| May   | 240,000                             | 1,100                   |
| June  | 300,000                             | 1,000                   |

(Adapted from Teagasc, 2025)

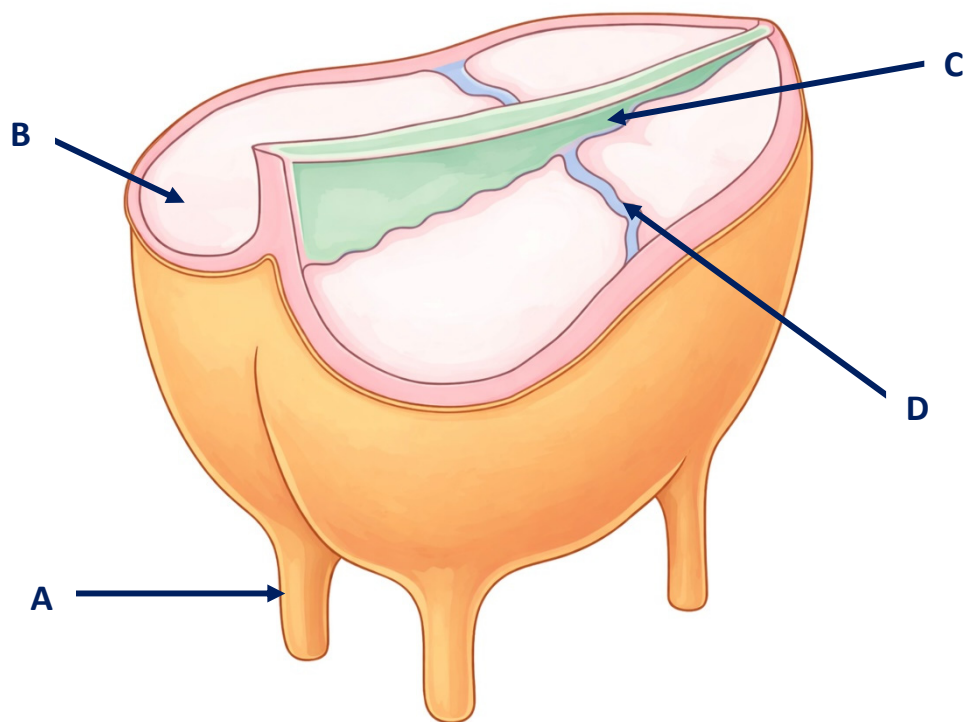
- (i) Draw a trend graph with Somatic Cell Count (SCC) on the X-axis and milk yield on the y-axis.

### Relationship between Somatic Cell Count (SCC) and Milk Yield



- (ii) Identify **any three** parts labelled **A, B, C** and **D** of the udder using the list of words below.

|         |                          |      |                            |
|---------|--------------------------|------|----------------------------|
| Quarter | Connective tissue septum | Teat | Median suspensory ligament |
|---------|--------------------------|------|----------------------------|

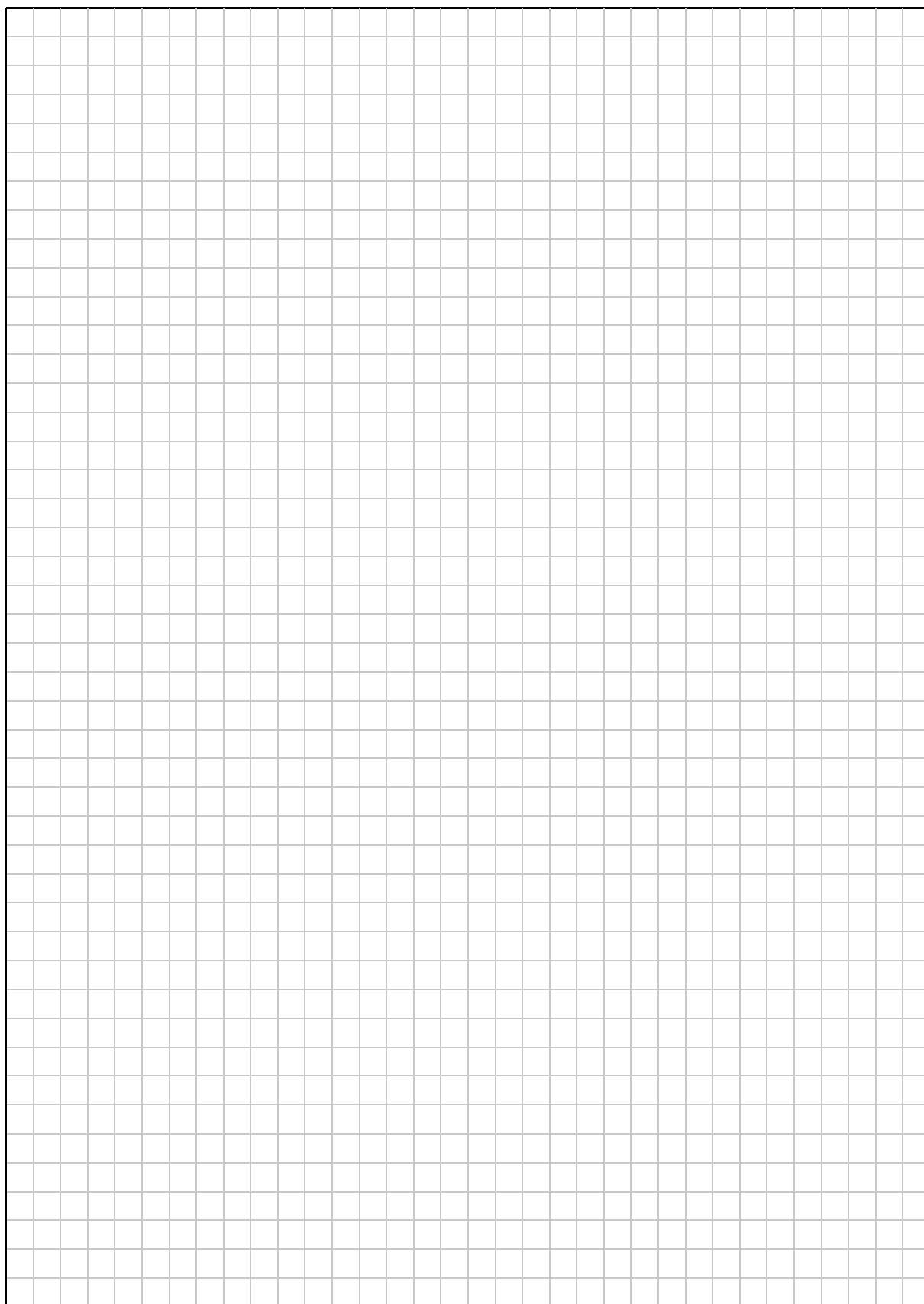


|   |  |
|---|--|
| A |  |
| B |  |
| C |  |
| D |  |

[illegible]



Additional graph paper.  
Label all work clearly with the question number and part.



## Acknowledgements

### Image(s)

|         |                                                                                                    |
|---------|----------------------------------------------------------------------------------------------------|
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### Text

|         |                                                                                                                                                                                                                                                                                                                                                                                   |
|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Page 30 | Jordan, S. Browne, N. Herron, J. <i>Using technology to reduce our carbon footprint.</i><br><a href="https://www.farmersjournal.ie/focus/signpost-programme/agnav-an-online-platform-to-measure-your-farm-s-sustainability-845907">https://www.farmersjournal.ie/focus/signpost-programme/agnav-an-online-platform-to-measure-your-farm-s-sustainability-845907</a> . 04 Dec 2024 |
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Leaving Certificate – Ordinary Level

## Agricultural Science

Monday 15 June

Afternoon 2:00 - 4:30