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AGRICULTURE

0600/12

Paper 1 Theory

October/November 2022

1 hour 45 minutes

You must answer on the question paper.

No additional materials are needed.

INSTRUCTIONS

- Section A: answer **all** questions.
- Section B: answer **two** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You may use a calculator.
- You should show all your working and use appropriate units.

INFORMATION

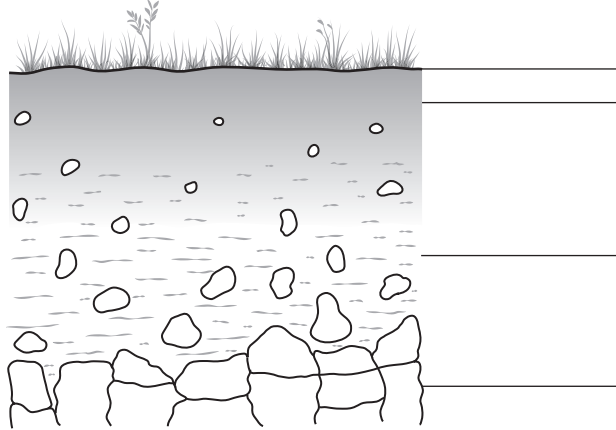
- The total mark for this paper is 100.
- The number of marks for each question or part question is shown in brackets [].

This document has **24** pages. Any blank pages are indicated.

Section A

Answer **all** the questions in the spaces provided.

- 1 (a) The diagram shows a simple soil profile.



- (i) The table shows some parts of a simple soil profile.

A	soil surface
B	subsoil
C	underlying materials
D	topsoil

Write the letters **A**, **B**, **C** and **D** next to the correct label lines. [3]

- (ii) Circle the layer in which most soil organisms would be expected to be found.

soil surface **subsoil** **underlying materials** **topsoil**

[1]

- (iii) Suggest why soil organisms are important for a healthy soil.

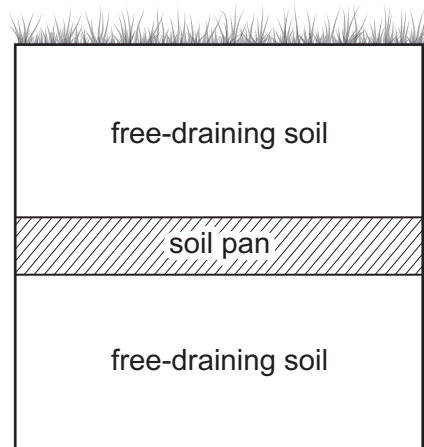
.....

.....

.....

..... [2]

(b) This diagram shows part of a soil profile that contains a soil pan.



(i) Explain how ploughing can cause a soil pan to form.

.....

.....

.....

..... [2]

(ii) Suggest why a soil pan can reduce the quality of a crop grown in a field.

.....

.....

.....

..... [2]

[Total: 10]

- 2 (a)** The shaded areas show the soil pH when some elements are most available to a plant.

	soil pH								
	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0
nitrogen									
phosphorus									
potassium									
calcium									
magnesium									
sulfur									
iron									

Use the table to:

- (i)** state the element available at pH 8.5

..... [1]

- (ii)** state which element is available in the most acidic soils

..... [1]

- (iii)** state the range of pH where calcium is most available.

from pH

to pH

[1]

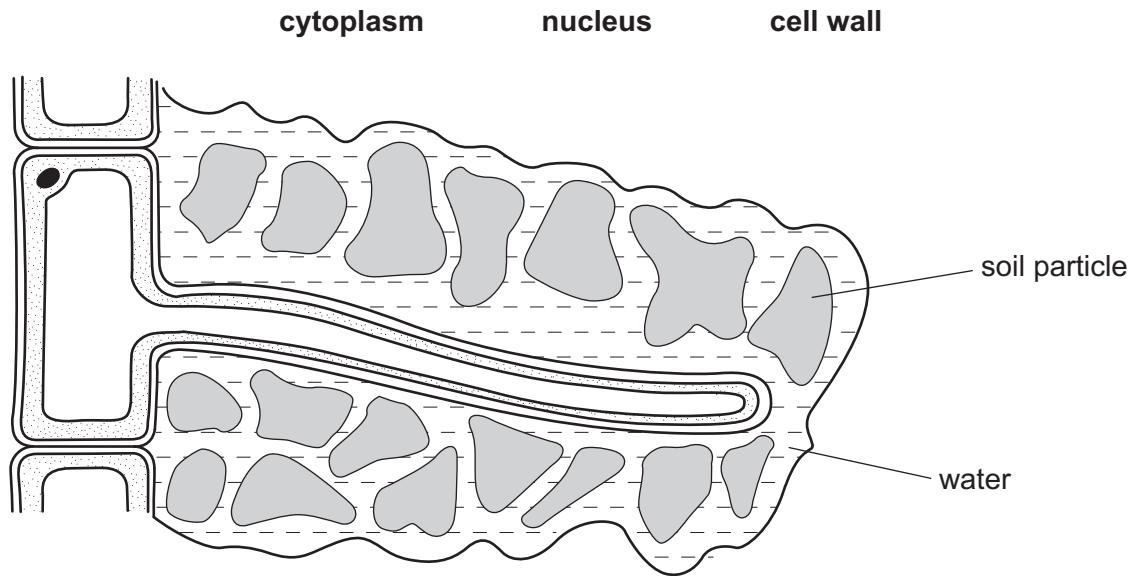
- (b)** Suggest how a farmer could improve a soil of pH 5.5 to make more nutrients available.

..... [1]

[Total: 4]

3 (a) The diagram shows a root hair cell.

(i) Label the following parts of the root hair cell.



[3]

(ii) Suggest how the structure of the root hair cell helps it take in nutrients and water.

.....

.....

.....

..... [2]

(b) Explain the difference between osmosis and diffusion in plant transport systems.

.....

..... [1]

(c) (i) Describe **three** environmental conditions that would increase the rate of transpiration in crops.

1

2

3 [3]

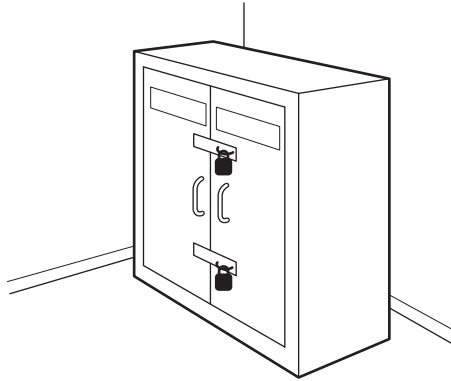
(ii) Suggest **one** way a farmer could reduce transpiration loss in their crop.

.....

..... [1]

[Total: 10]

- 4 (a) The diagram shows a container used to store dangerous farm chemicals.



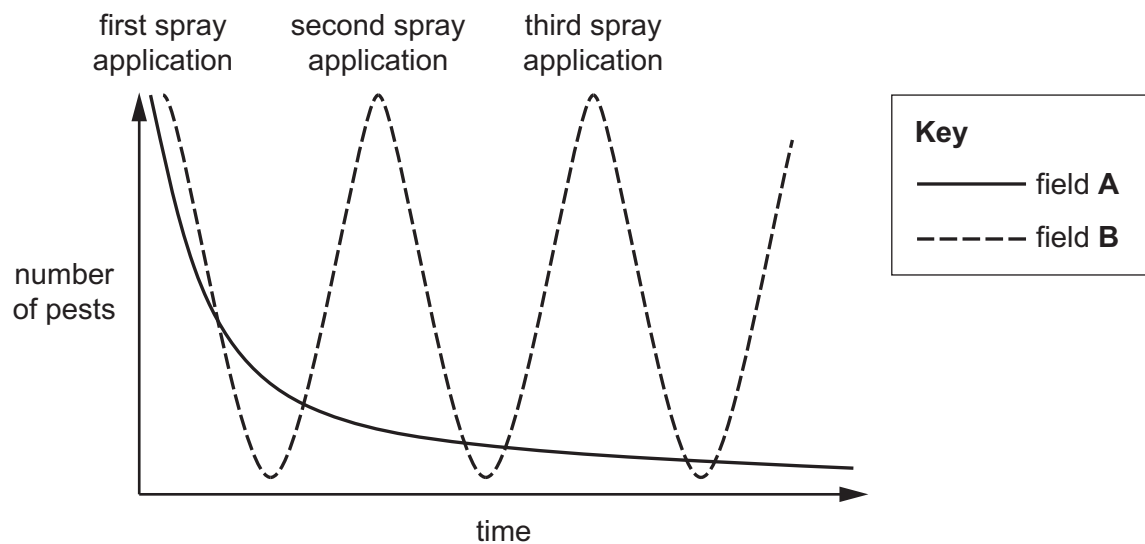
Other than being lockable, suggest **three** features of a container that help store farm chemicals safely.

- 1
- 2
- 3 [3]

- (b) A farmer is investigating the best method to control pests. The same crop is grown in two fields.

In field **A** a predator of the pest is introduced. In field **B** the pests are sprayed several times with a pesticide.

The results of the investigation are shown on the graph.



Suggest **one** advantage and **one** disadvantage of using a predator to control pests.

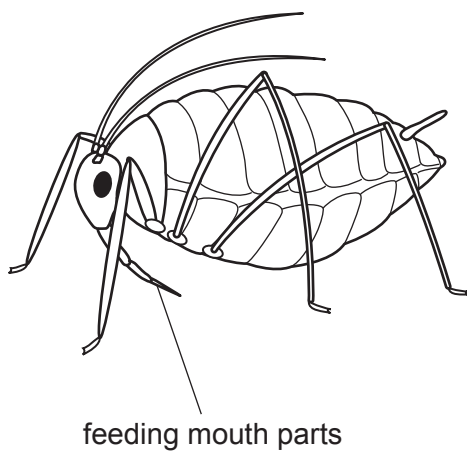
- advantage
-
- disadvantage
- [2]

- (c) A spray used to control aphids is applied to a crop at a rate of 1.2 litres per hectare.

Calculate the volume of this spray that would be needed to treat a field of 25.25 hectares.

..... litres [1]

- (d) The diagram shows an aphid, which is a pest of many crops.



Explain how this pest spreads viral diseases.

.....

.....

.....

.....

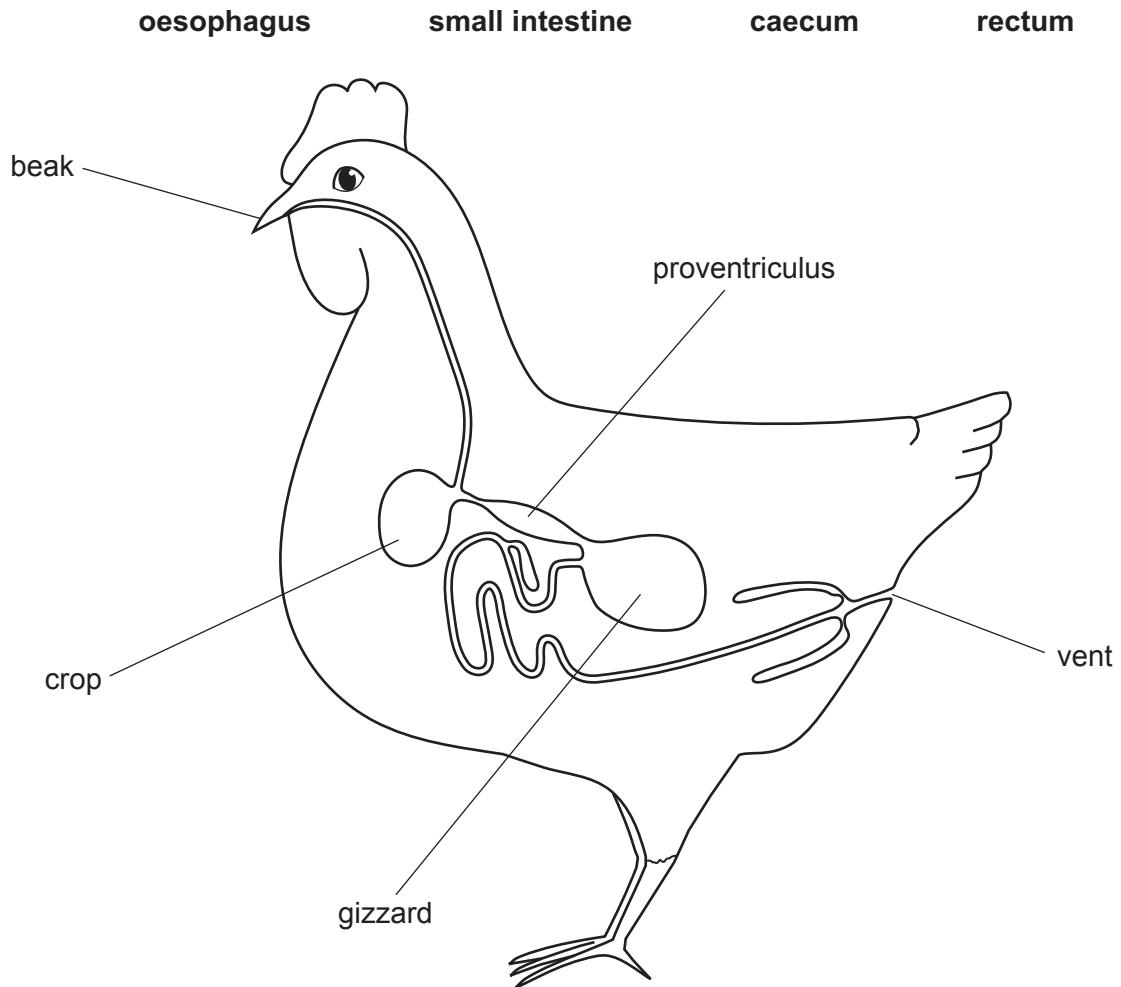
.....

..... [3]

[Total: 9]

5 The diagram shows part of the digestive system of a bird.

(a) Label the following on the diagram.



[4]

(b) Some birds eat small stones, which are held in the gizzard. The gizzard is a large muscular organ. Birds have no teeth so cannot chew their food.

Suggest how the gizzard might aid digestion in birds.

.....

.....

.....

..... [2]

[Total: 6]

- 6 (a) A young animal needs to be fed using a bottle.

The bottle contains feed made up from powdered milk and water.

The table shows the volume of feed needed during the first 21 days.

- (i) Calculate and fill in the missing volumes in the table.

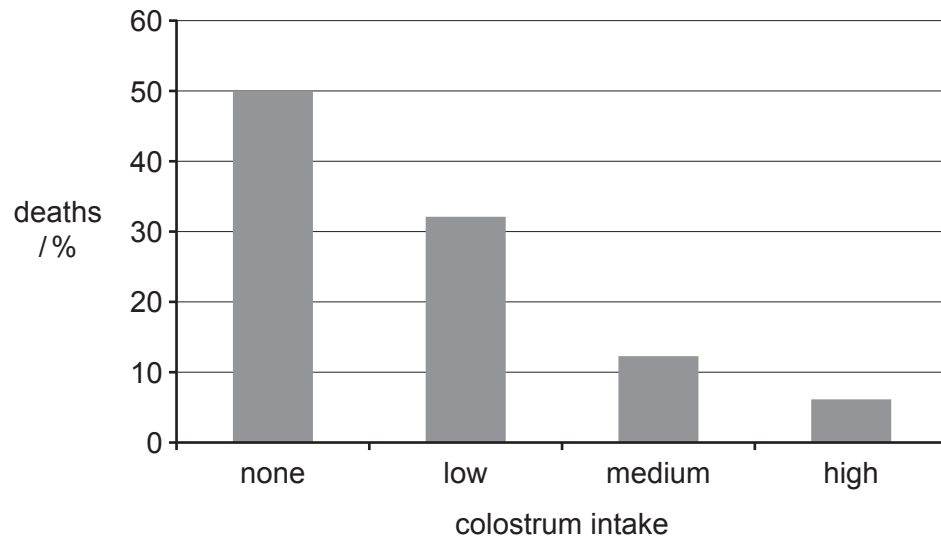
feeding period	feeds per day	volume drunk at each feed /cm ³	volume drunk per day /cm ³	total volume drunk in feeding period /cm ³
day 1–2	6	140	840	1 680
day 3–7	4	200		4 000
day 8–14	3	500	1 500	10 500
day 15–21	3	700	2 100	

[2]

- (ii) Calculate, using the table, the total volume drunk by the young animal over the 21-day period.

..... cm³ [1]

- (b) Drinking colostrum soon after birth is important for some young animals to survive. The bar chart shows the link between colostrum intake and deaths of some young animals.



- (i) State the percentage of deaths in the young animals that drank no colostrum.

.....% [1]

- (ii) Using your knowledge of the importance of colostrum, explain the pattern shown by the bar chart.

.....

.....

.....

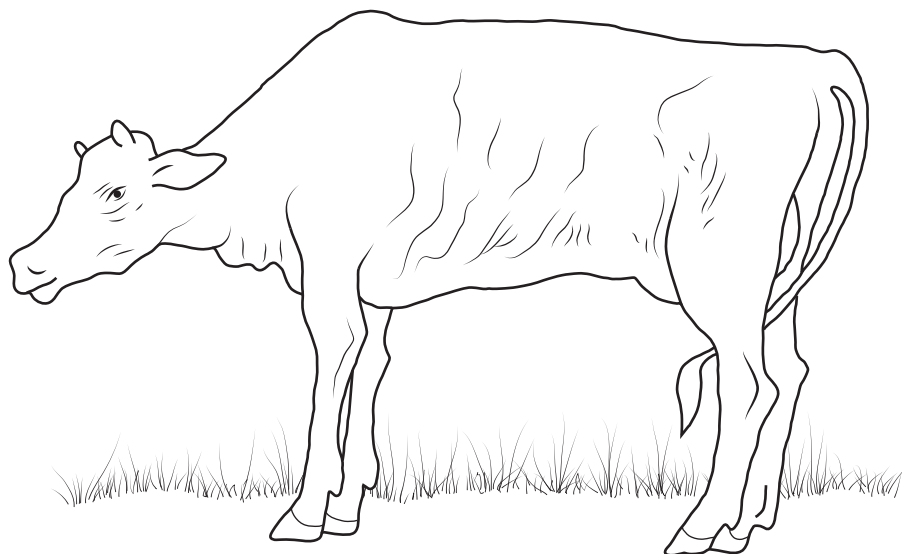
.....

.....

..... [3]

[Total: 7]

- 7 (a) The diagram shows a cow suffering from ill-health.



Identify **three** ways that you can tell that this cow is suffering from ill-health.

1

2

3

[3]

- (b) Suggest the precautions that a farmer should take before introducing a cow from another farm into their herd.

.....

.....

.....

.....

.....

..... [2]

- (c) Describe what a farmer should do if they suspect a notifiable disease on their farm.

.....

.....

.....

..... [2]

[Total: 7]

- 8 (a) The photograph shows livestock being kept in a zero-grazing system.



- (i) Describe what is meant by zero grazing.

.....

.....

.....

..... [2]

- (ii) Explain how zero grazing increases the efficiency of livestock production.

.....

.....

.....

..... [2]

- (iii) Suggest **one** problem of a zero-grazing system.

.....

..... [1]

- (b) Compare the features of intensive grazing systems with the features of extensive grazing systems.

.....

.....

.....

.....

.....

..... [3]

[Total: 8]

- 9 (a) A farmer is preparing a field to grow Irish potatoes.

Place these tools in the order they would be used to prepare the field.

	cultivator	harrow	planter	plough	ridger
1					
2					
3					
4					
5					

[4]

- (b) The farmer has finished using the cultivator for the season.

Describe **two** maintenance tasks that should be carried out on the cultivator before it is stored.

1

.....

2

.....

[2]

- (c) Suggest the missing steps in the sequence of tasks to replace a tap washer.

task 1 turn water supply off

task 2

.....

task 3

.....

task 4 attach new washer

task 5

.....

task 6 turn water supply back on

[3]

[Total: 9]

Section B

Answer any **two** questions.

Write the question numbers you have chosen here:

- 10** (a) Explain **two** reasons selective breeding may be used on a farm. [4]
- (b) Describe how artificial insemination (AI) can be used in selective breeding. Suggest **two** ways that the use of AI can improve health and safety on a farm. [6]
- (c) Suggest how a large farm animal should be safely moved around a farm. [5]

[Total: 15]

- 11** (a) Describe the advantages and disadvantages of the different materials used to construct animal housing. [6]
- (b) Describe the features needed in good animal housing. [5]
- (c) Explain why low-quality housing can lead to ill-health in livestock. [4]

[Total: 15]

- 12** (a) Other than hydroponics, suggest how farming practices can increase food production to meet the needs of a growing world population. [7]
- (b) Farmers are increasingly converting to organic methods of production.
Other than pricing, discuss the possible reasons for this. [4]
- (c) Explain how the principles of supply and demand may affect the price of organic crops. [4]

[Total: 15]

- 13** (a) There are many ways a farm can be supplied with water.
Discuss the advantages and disadvantages of **two** different sources of water. [6]
- (b) Suggest why the water used for livestock and the water used for irrigation can be of different qualities. [4]
- (c) Describe what is meant by hydroponics. Explain how hydroponics can increase the land available for crop production. [5]

[Total: 15]

- 14** (a) Explain how intensive agriculture can increase soil erosion. [6]
- (b) Outline the farming practices that can be used to reduce soil erosion. [5]
- (c) Describe what is meant by capillary water and hygroscopic water. Explain why the difference between these types of water is important for plants. [4]

[Total: 15]

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