



Cambridge O Level

CANDIDATE
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AGRICULTURE

5038/12

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

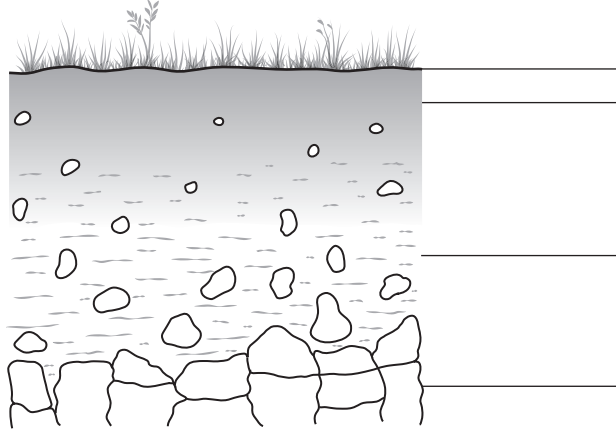
- The total mark for this paper is 100.
- The number of marks for each question or part question is shown in brackets [].

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.

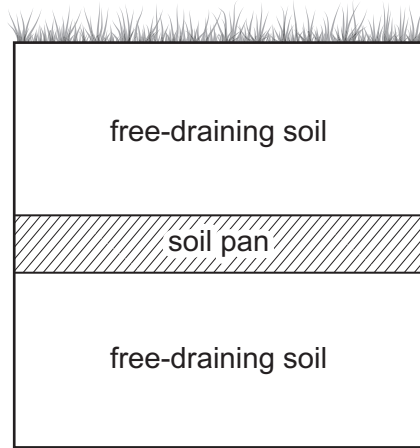
.....

.....

.....

..... [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]

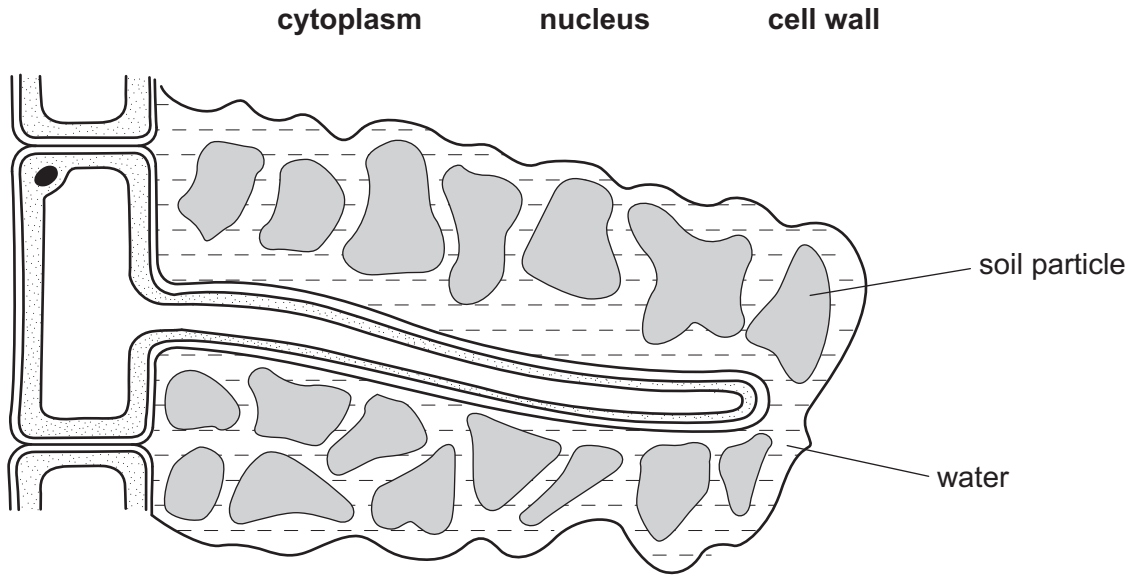
(b) Suggest how a farmer could improve a soil of pH 5.5 to make more nutrients available.

..... [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.

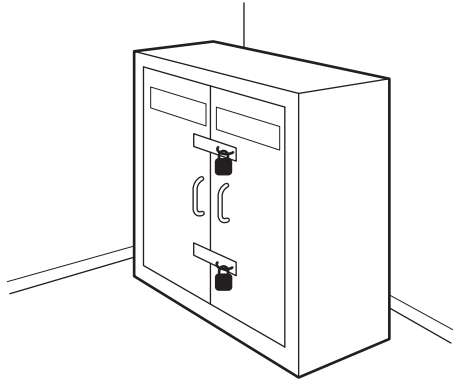
1
 2
 3 [3]

(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.



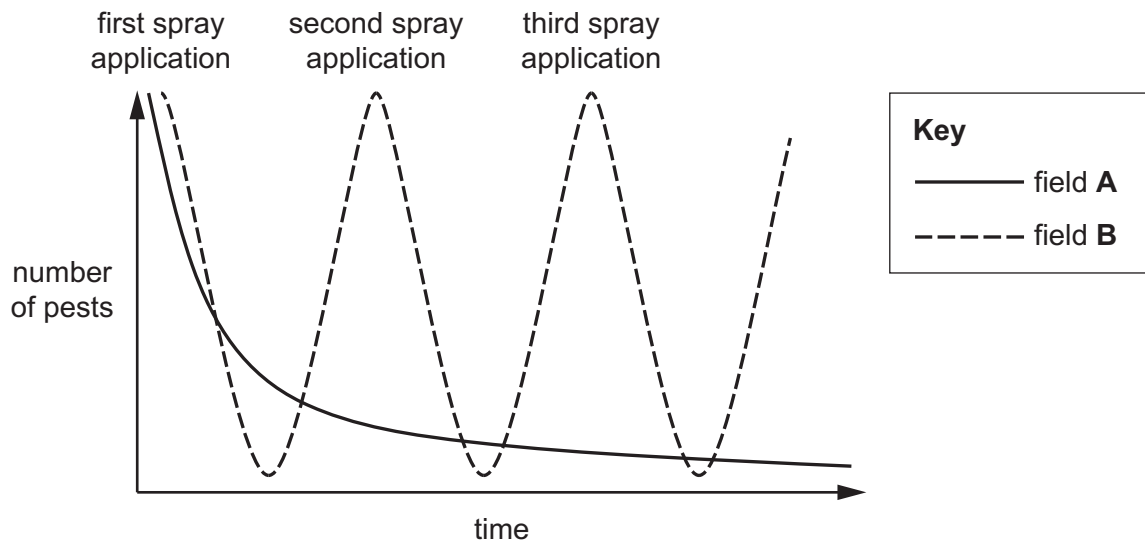
Other than being lockable, suggest **three** features of a container that help store farm chemicals safely.

- 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.

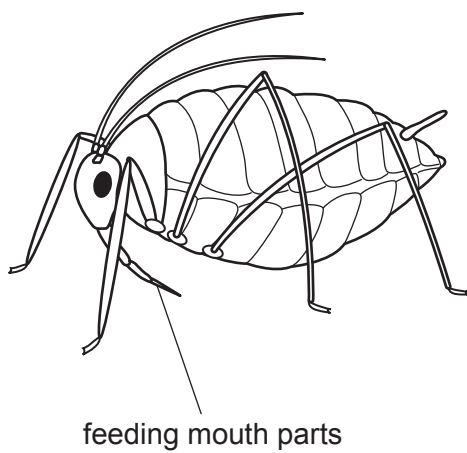
- advantage
-
- disadvantage
- [2]

(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.

.....

.....

.....

.....

.....

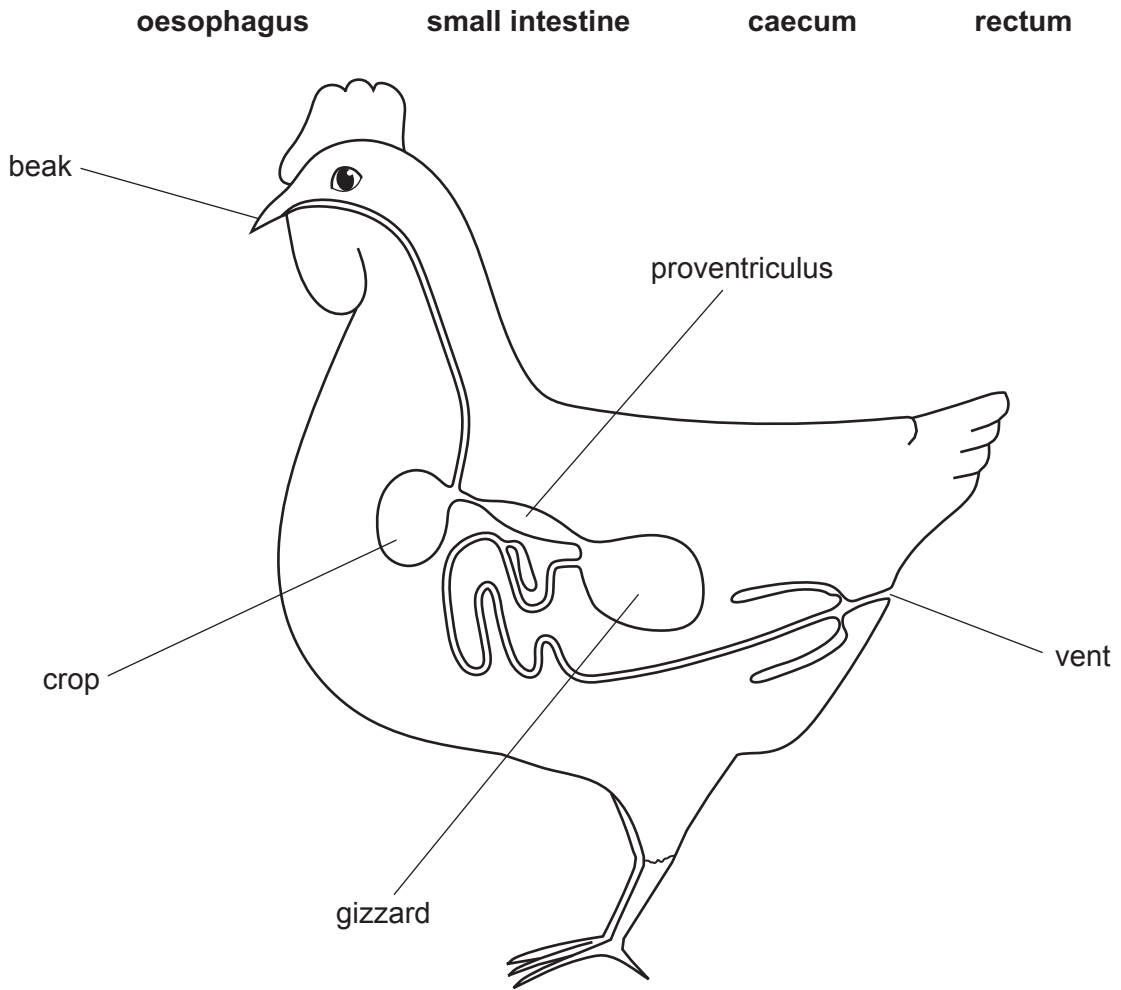
.....

..... [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.

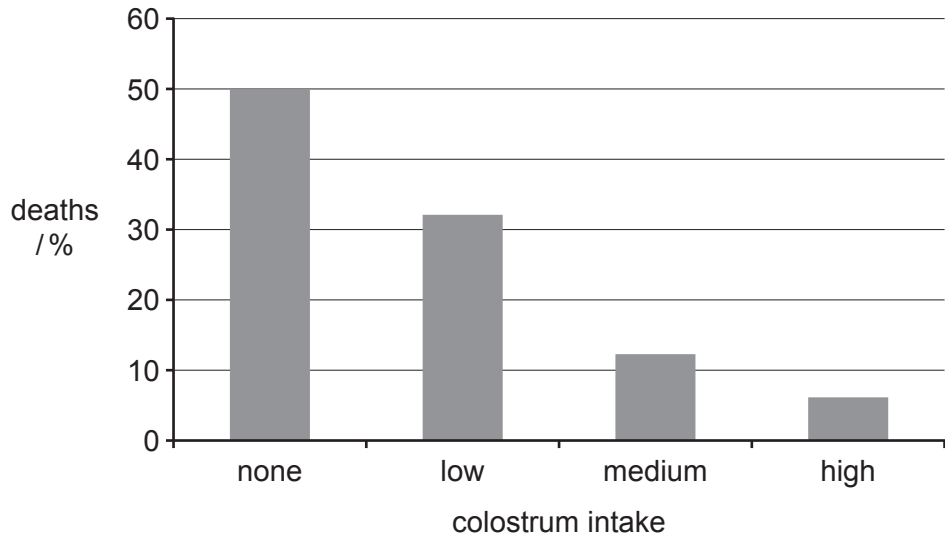
feeding period	feeds per day	volume drunk at each feed /cm ³	volume drunk per day /cm ³	total volume drunk in feeding period/cm ³
day 1–2	6	140	840	1 680
day 3–7	4	200	4 000
day 8–14	3	500	1 500	10 500
day 15–21	3	700	2 100

[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.

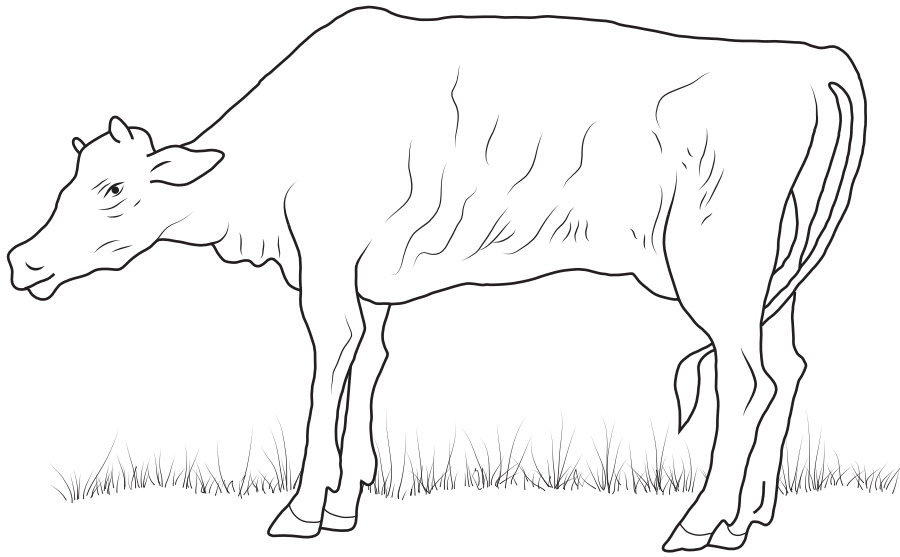
.....% [1]

(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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