

GENERAL CERTIFICATE OF SECONDARY EDUCATION
ENVIRONMENTAL AND LAND-BASED SCIENCE
Plant Cultivation (Foundation Tier)

B491/01

Candidates answer on the Question Paper
A calculator may be used for this paper

OCR Supplied Materials:
None

Other Materials Required:

- Pencil
- Ruler (cm/mm)

Monday 18 January 2010
Morning

Duration: 45 minutes



Candidate Forename		Candidate Surname	
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Centre Number						Candidate Number				
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INSTRUCTIONS TO CANDIDATES

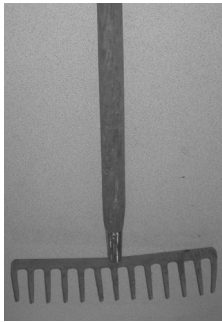
- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Answer **all** the questions.
- Do **not** write in the bar codes.
- Write your answer to each question in the space provided, however additional paper may be used if necessary.
- There are no separate marks for the quality of written communication, but make sure that your answers are written in clear and well-structured English.

INFORMATION FOR CANDIDATES

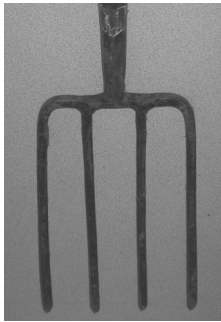
- The number of marks is given in brackets [] at the end of each question or part question.
- The total number of marks for this paper is **36**.
- This document consists of **16** pages. Any blank pages are indicated.

Answer **all** the questions.

1 The photographs show some garden tools.



garden rake



fork



hoe



spade

These tools are used for different jobs in the garden.

Which of the tools is best for each of these jobs?

adding farmyard manure to the soil

producing a good tilth to the seed bed [2]

2 The photographs show wind pollinated and insect pollinated plants.



wind pollinated

insect pollinated

Wind pollinated and insect pollinated flowers have a number of different adaptations.

Match the descriptions below to the correct type of flower by writing **A**, **B**, **C**, **D**, **E** or **F** in the boxes.

- A** produces nectar
- B** produces lots of small, light pollen
- C** stigmas are large and feathery
- D** anthers hang outside the flower
- E** produces small quantities of large, sticky pollen
- F** flowers are large and scented

[2]

3 The photograph shows a student sowing seeds in compost.



The student is sowing seeds in compost **not soil**.

This is because compost:

- A needs less watering
- B comes in bags so is easier to transport
- C does not dirty her clothes as much
- D is free from weeds.

Answer **A, B, C** or **D** [1]

4 A grower has two pure bred plants.

Plant **A** has red flowers.

Plant **B** has white flowers.

Plant **A** is crossed with plant **B**.

Plant **A** is crossed with plant **B** to produce plant **C**.

The photograph shows plant **C** which has red flowers.



What is the phenotype of plant **C**?

A dominant

B F_1

C red

D Rr

Answer **A, B, C** or **D** [1]

5 The photograph shows a bulb with two daughter bulbs.

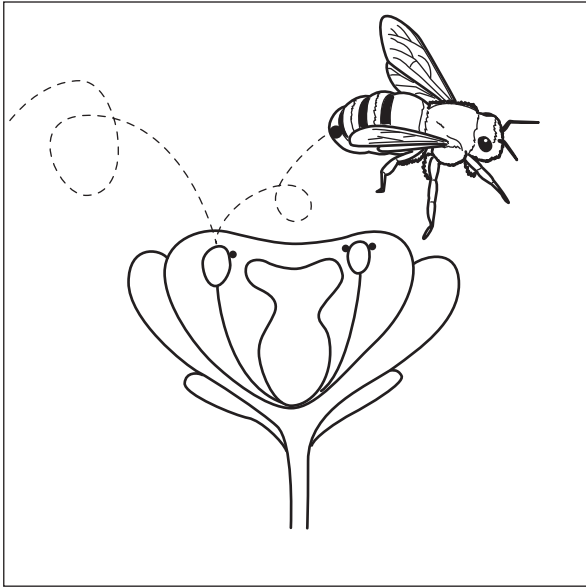


Which **one** of the following statements about the daughter bulbs is true?

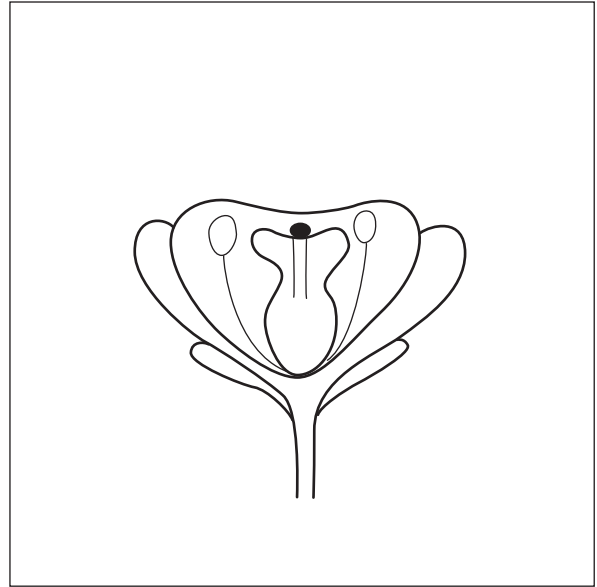
- A They will all produce different coloured flowers.
- B They will all produce the same coloured flowers as the original bulb.
- C They will produce smaller flowers than the original bulb.
- D They are more disease resistant than the original bulb.

Answer **A, B, C** or **D** [1]

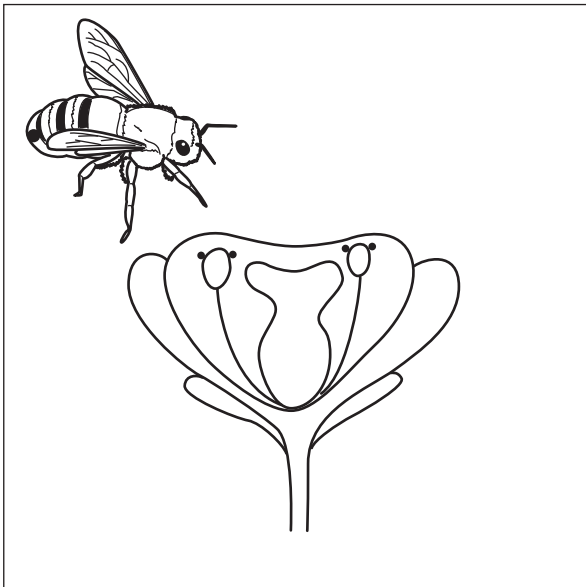
6 The diagrams show stages in insect pollination (not to scale).



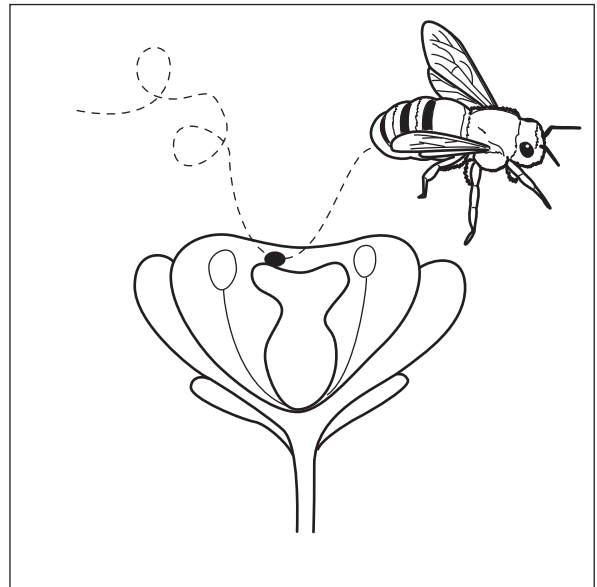
A



B



C



D

Put the diagrams in the correct order by writing **A**, **B**, **C** or **D** in the boxes.

[2]

(first)

(last)

7 The photograph shows how soil may be cultivated by machine rather than by hand.



Farmers use machines to cultivate their soils because:

- A they do not compact the soil
- B they are easy to use in small fields
- C they do not miss any areas
- D they are more efficient.

Answer **A, B, C** or **D** [1]

8 You need to take care when growing plants.

Instructions help to reduce risks from hazards.

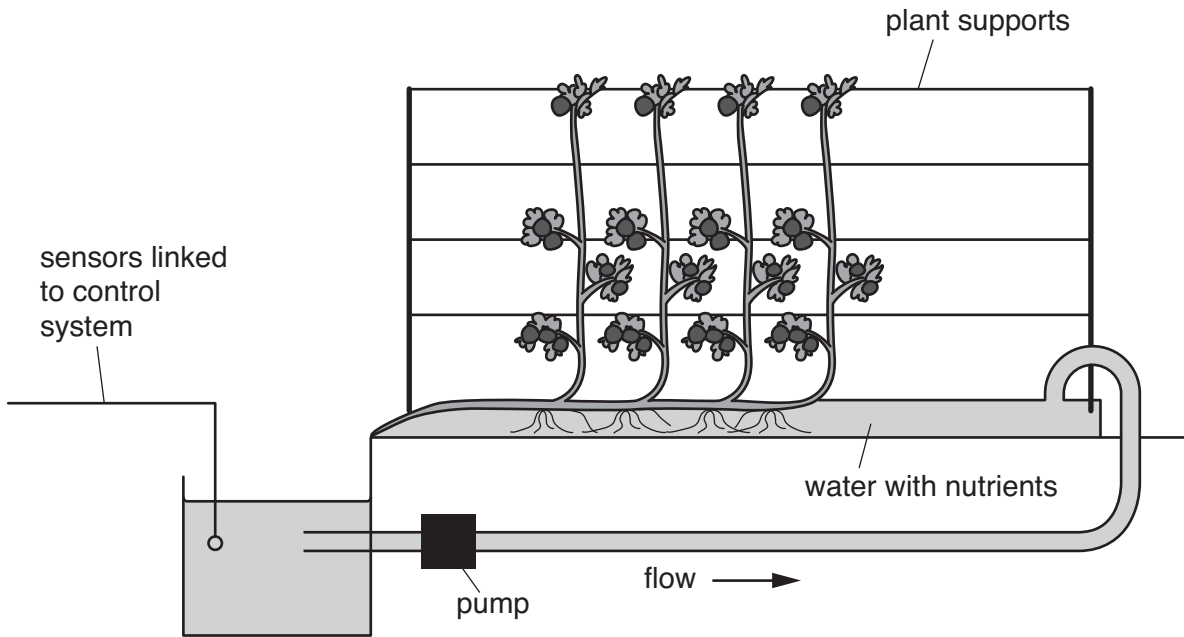
Complete the following table of instructions.

The first one has been done for you.

hazard	instructions
carrying a large bag of compost	bend your knees, not your back
carrying a garden fork
adding farmyard manure to a vegetable plot
working in a glasshouse

[3]

- 9 Tomato plants are often grown using a system called **hydroponics** which does not use soil. Water and nutrients flow along shallow channels.



The sensors are used to detect and control conditions such as temperature.

- (a) Name **two** other conditions in the solution that the sensors could detect.

1

2 [2]

- (b) Which mineral nutrient should be present in the largest amount?

Suggest a reason for your answer.

.....

..... [2]

- (c) State one function of the roots of **these** tomato plants.

.....

..... [1]

10 (a) A farmer is growing sugar beet.

It is important to control the weeds on the field.

The farmer carries out a trial to test this.

He measures the vigour (health) of his crop on a scale from 0–10.

0 = poor crop growth

10 = maximum crop growth

The table shows the results of the trial.

control method	vigour of crop	weed count	cost (£/hectare)
standard herbicide	8	87	125
glyphosate herbicide	10	36	30
untreated	6	339	0

The farmer decides to change from using the standard herbicide to glyphosate herbicide.

Calculate the percentage (%) decrease in the cost of herbicide.

..... [1]

(b) Suggest **one** advantage and **one** disadvantage of the method he uses to measure the vigour of his crop.

advantage

.....

disadvantage

..... [2]

11 The photograph shows a spider plant.



Spider plants reproduce by asexual reproduction (vegetative propagation) using runners.

Name another **crop** plant that reproduces using runners.

..... [1]

- 12 (a) Inorganic fertilisers can be added to plants to make them grow better.

The table shows the percentage composition of a common inorganic fertiliser.

component	percentage (%)
nitrogen (N)	15
phosphorus (P)	30
potassium (K)	30
copper (Cu)	0.06
iron (Fe)	0.15
zinc (Zn)	0.07
non nutrient material	24.72

Put a ring around the correct word in the list below.

The nutrient present in the smallest percentage is:

nitrogen

phosphorus

potassium

copper

iron

zinc

[1]

- (b) The manufacturer refers to this as an N: P: K fertiliser with trace elements.

Name **two** of the trace elements.

1

2 [1]

- (c) What percentage of the fertiliser is **not** N: P: K?

- A** 0.15%
B 24.72%
C 25.00%
D 75.00%

Answer **A, B, C** or **D** [1]

13 State **three** features of organic fertilisers that make them different from inorganic fertilisers.

1

.....

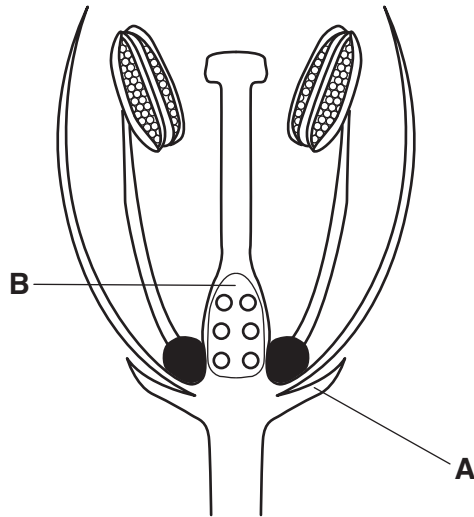
2

.....

3

..... [3]

14 The diagram shows a section through a flower.



Name the structures labelled **A** and **B**.

A

B [2]

15 The photograph shows tomato plants growing in a glasshouse.



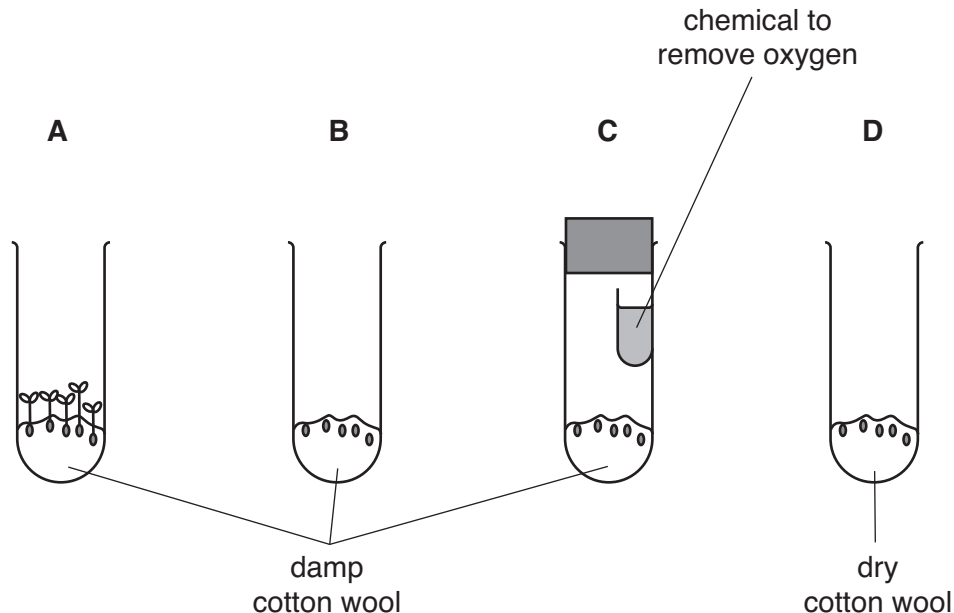
Describe in detail **three** tasks that should be carried out on these plants throughout the summer.

1

2

3 [3]

16 A student set up an experiment to see the conditions needed for cress seeds to germinate. Tubes **A**, **C** and **D**, were kept in a warm room for ten days. Tube **B** was kept in a fridge for ten days. The results are shown.



Describe and explain the results for each tube.

.....
.....
.....
.....
.....
.....
.....
.....
.....

[3]

END OF QUESTION PAPER



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