

Candidate forename						Candidate surname					
Centre number						Candidate number					

OXFORD CAMBRIDGE AND RSA EXAMINATIONS
GCSE

B491/03

**ENVIRONMENTAL AND
LAND-BASED SCIENCE**

Plant Cultivation (Foundation Tier)

MONDAY 25 JUNE 2012: Afternoon

**DURATION: 45 minutes
plus your additional time allowance**

MODIFIED ENLARGED

Candidates answer on the Question Paper.

OCR SUPPLIED MATERIALS:

None

OTHER MATERIALS REQUIRED:

Electronic calculator

Pencil

Ruler (cm/mm)

READ INSTRUCTIONS OVERLEAF

INSTRUCTIONS TO CANDIDATES

- **Write your name, centre number and candidate number in the boxes on the first page. Please write clearly and in capital letters.**
- **Use black ink. HB pencil may be used for graphs and diagrams only.**
- **Answer ALL the questions.**
- **Read each question carefully. Make sure you know what you have to do before starting your answer.**
- **Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).**

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.**

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Answer ALL the questions.

- 1 Plants can reproduce using different methods of **ASEXUAL REPRODUCTION** (vegetative propagation).

Draw lines to connect each **METHOD** to the correct **EXAMPLE**.

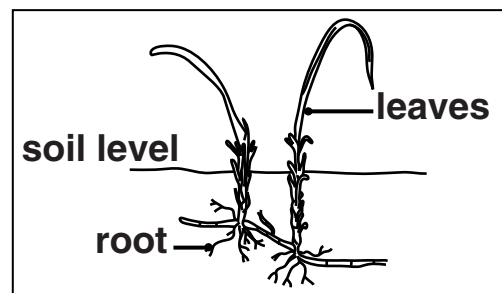
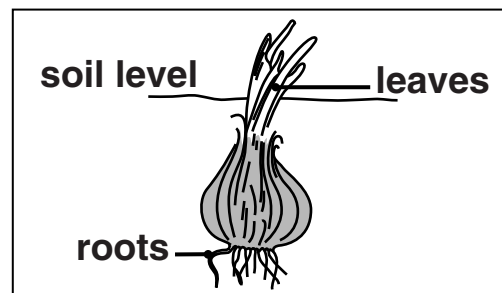
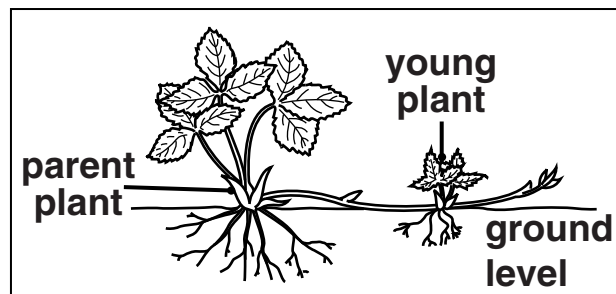
METHOD

bulb

rhizome

runner

EXAMPLE



[2]

2 Plants can be grown from seeds.

The following statements are about sowing seeds.

A Cover the seeds with a thin layer of compost.

B Place some compost in a seed tray.

C Sprinkle the seeds thinly over the compost.

D Water the seeds and place in a greenhouse.

Write the letters A, B, C or D in the boxes to show the correct order for sowing seeds.

1	<input type="text"/>	2	<input type="text"/>	3	<input type="text"/>	4	<input type="text"/>	[2]
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3 Fertilisers can be either organic or inorganic.

Which TWO statements are true for ORGANIC fertilisers only?

Put ticks (✓) in the boxes next to the two correct statements.

They release only NPK into the soil.

☐

They improve the soil structure.

☐

They can cause pollution.

☐

Their nutrients are dissolved in the soil water.

☐

They improve the growth of crops.

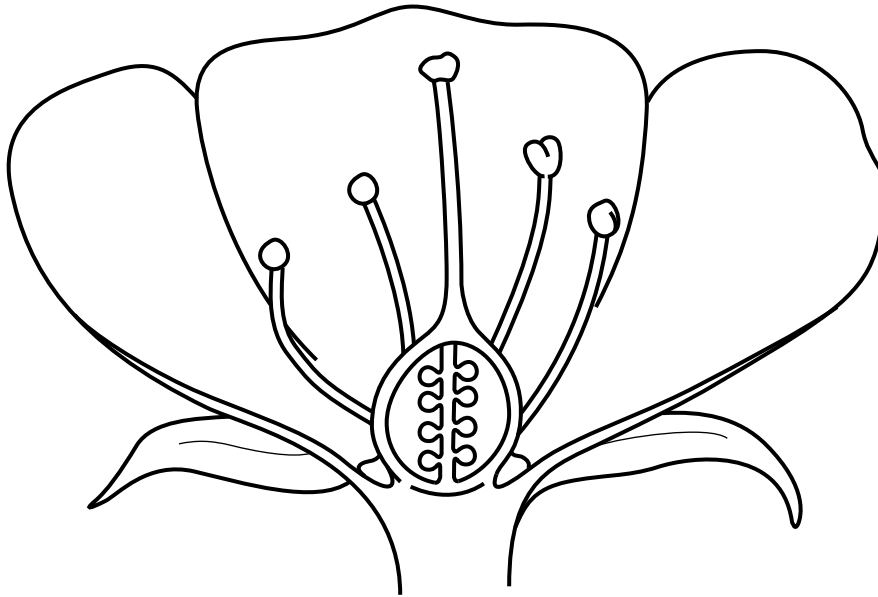
☐

They come from only natural sources.

☐

[2]

4 The diagram shows a section through a flower.



Complete the sentence about sepals.

The sepals ...

A ... are where pollen lands during pollination.

B ... are where the pollen tube grows down.

C ... attract bees for pollination.

D ... protect the flower whilst in bud.

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

- 5 A tall pea plant with white flowers was crossed with a short pea plant with red flowers.**

All the offspring were tall with red flowers.

Characteristics such as height and colour are controlled by genes.

Genes have different forms called alleles.

Alleles can be either dominant or recessive.

Which TWO of the following statements are correct?

Put ticks (✓) in the boxes next to the two correct statements.

The allele for white flowers is dominant. ☐

The allele for tall plants is dominant. ☐

The allele for red flowers is stronger. ☐

The F1 generation are all tall. ☐

The F1 generation are all white. ☐

The allele for tall plants is recessive. ☐

[2]

- 6 Plant roots need to absorb three major nutrients in order to grow properly.**

List TWO of these nutrients.

1 _____

2 _____

[2]

- 7 Plants which are healthy grow better and look more attractive.**

It is often easy to tell if a plant is healthy by looking at the leaves.

State TWO ways in which you could tell that a plant is healthy by looking at the LEAVES.

1 _____

2 _____

[2]

8 Patrick sowed some cress seeds in a pot.

He put the pot on a sunny window sill.

He watered the seeds every day.

Two weeks later the seeds have still not germinated.

Suggest a reason why.

[1]

- 9 A team of scientists are researching the best way to grow potatoes.

They cover half of the ground with a fleece blanket.

Soil temperature under the fleece is 2 °C warmer than without the fleece.

They weigh the potatoes at harvest.
The results are shown below.

YEAR	YIELD WITHOUT FLEECE (TONNES/ HECTARE)	YIELD WITH FLEECE (TONNES/ HECTARE)	INCREASE IN YIELD WITH FLEECE (TONNES/ HECTARE)
2006	16.89	19.40	2.51
2007	18.96	24.04	5.08
2008	19.11	23.59	4.48
2009	3.44	17.84	14.40

- (a) The scientists repeated the experiment for four years.

Suggest ONE reason for this.

[1]

- (b) Calculate the mean increase in yield of potatoes with the fleece over the four years.**

Answer _____ **tonnes/hectare [1]**

- (c) The increase in yield with the fleece was much greater in 2009 compared with the other years.**

Suggest ONE reason for this.

_____ **[1]**

- (d) A farmer is thinking about using fleece to increase the yield of potatoes.**

State ONE factor that the farmer should consider before making a decision.

_____ **[1]**

10 Samantha decides to grow vegetables in her garden.

(a) Describe how she would prepare the SOIL.

[3]

(b) Samantha has grown some potatoes in her vegetable patch.

Which garden tool would she use to harvest them?

A fork

B hoe

C rake

D rotovator

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

Samantha is storing the potatoes in her shed until she is ready to eat them.

- (c) She notices that some of the potatoes are starting to go mouldy.**

Suggest ONE reason why the potatoes are going mouldy.

_____ [1]

- (d) Samantha wants some advice about how to store her potatoes.**

State ONE piece of advice you would give her.

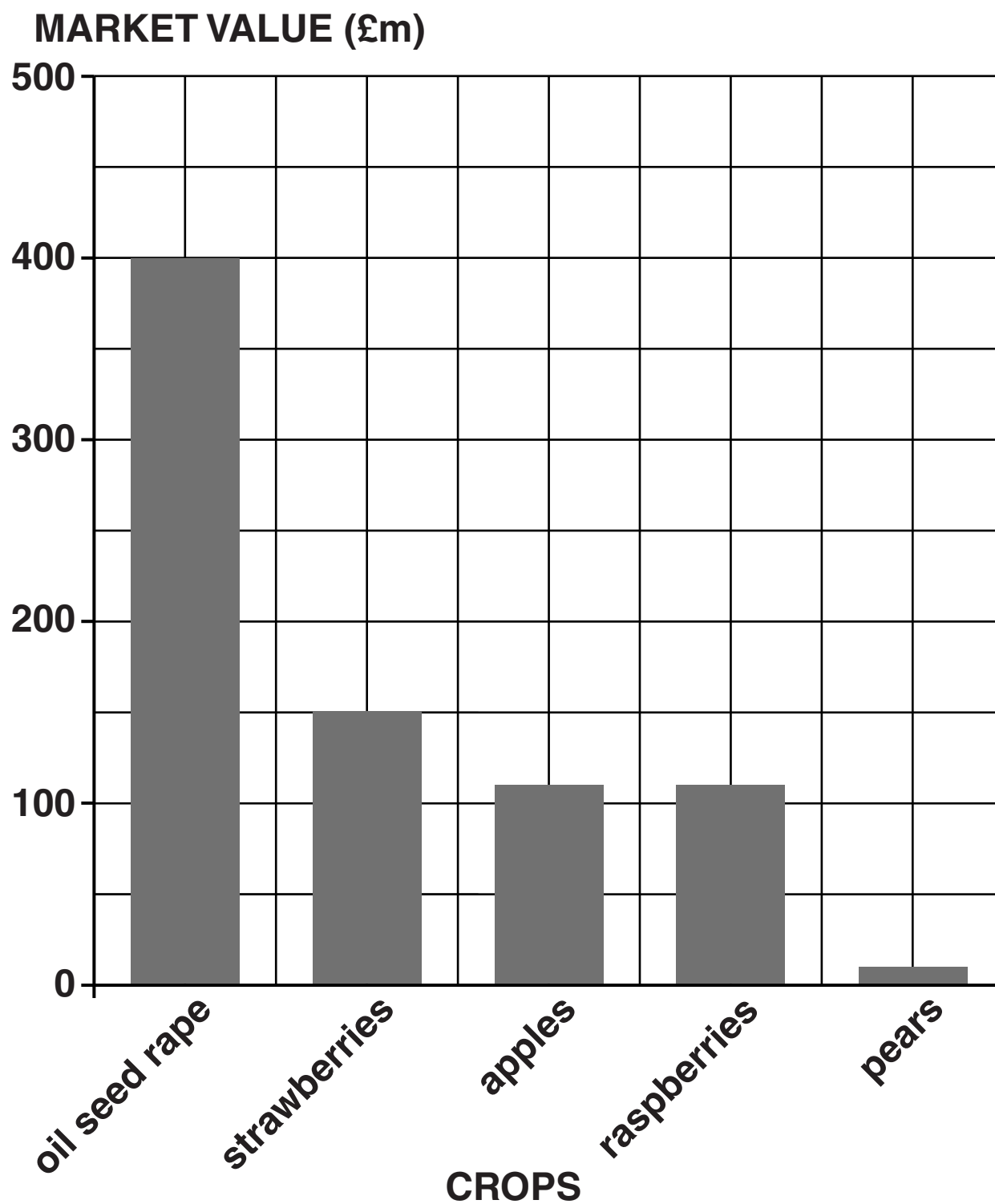
Give a reason for your answer.

_____ [2]

11 Honeybees are very important for pollinating crops.

Without honeybees, the yield of some crops would be reduced.

The graph shows the UK market value of honeybees in the production of some crops.



- (a) The value of honeybees to the UK economy is the same for two crops.**

Name these TWO crops.

_____ **[1]**

- (b) What is the market value of honeybees for growing strawberries?**

Answer £ _____ million [1]

- (c) The market value of honeybees when growing oil seed rape is greater than when growing pears.**

How many times greater?

A 40 times

B 100 times

C 390 times

D 400 times

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

12 Oil seed rape was grown in three different ways.

The yield and pollination efficiency were calculated.

The results are shown below.

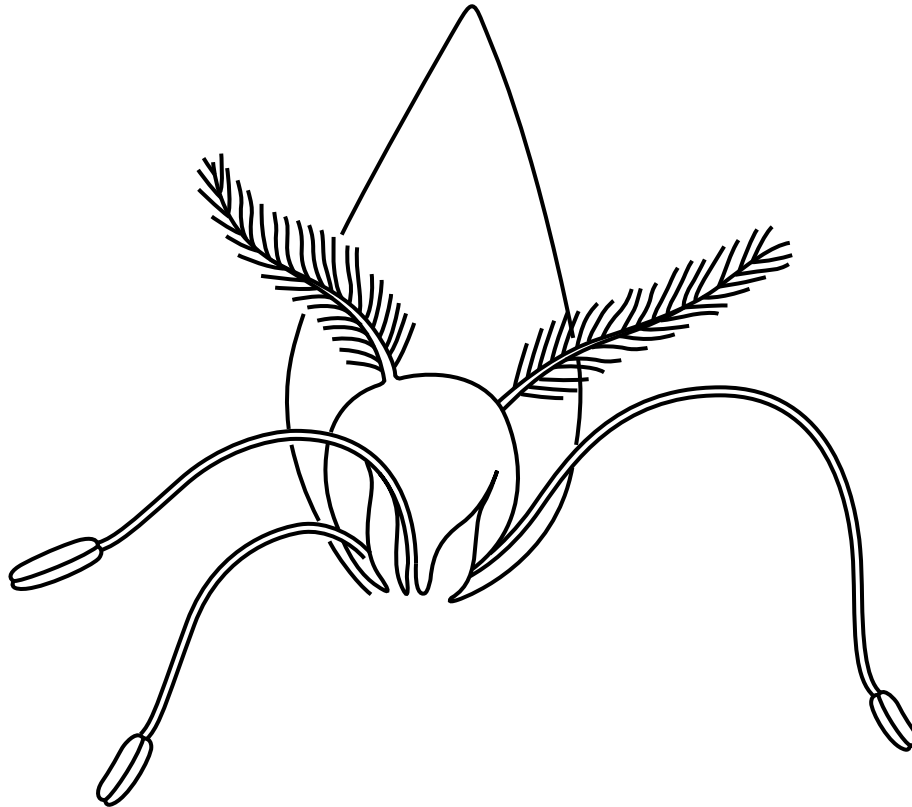
	YIELD (kg/hectare)	POLLINATION EFFICIENCY (%)
grown in a cage with bees	1113	62.6
grown in a cage without bees	32	12.4
grown in an open field	674	46.7

Describe the results in the table.

Suggest reasons for these results.

[3]

13 The diagram shows a grass flower.



The grass flower is pollinated by wind.

Give TWO ways in which this flower is adapted for wind pollination.

1. _____

2. _____

[2]

14 Some plants in the school greenhouse are covered in insects called whitefly.

A technician is going to spray the plants with pesticide.

If they are not applied correctly, pesticides can cause damage to humans and the environment.

Write a list of safety instructions for the technician.

You must include a reason for each instruction.

[3]

END OF QUESTION PAPER

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