

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 17 January 2011
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, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. Pencil may be used for graphs and diagrams only.
- 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).
- Answer **all** the questions.
- Do **not** write in the bar codes.

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 **20** pages. Any blank pages are indicated.

Answer **all** the questions.

1 The photograph shows a cabbage.



The cabbage has been damaged.

Which **one** of the following is the most likely cause of this damage?

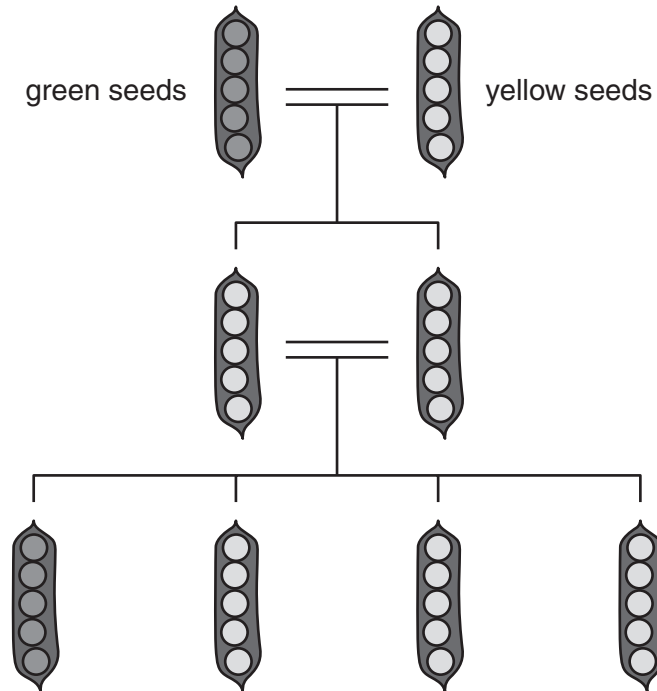
- A bacteria
- B caterpillars
- C fungi
- D mice

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

2 Pea plants can have either yellow or green seeds.

A pea plant with yellow seeds is crossed with a pea plant with green seeds.

The result is shown below.



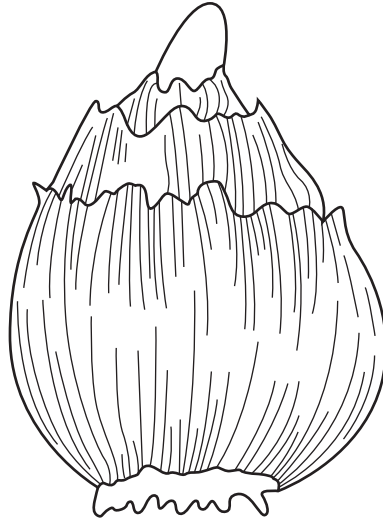
Which one of the following statements about the pea plants is **not** correct?

- A The gene for yellow seeds is dominant.
- B The gene for green seeds is recessive.
- C The F_1 generation are all yellow.
- D The gene for yellow seeds is stronger than the gene for green seeds.

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

3 Plants can reproduce by vegetative propagation (asexual reproduction) using bulbs.

The diagram shows an example of a bulb.

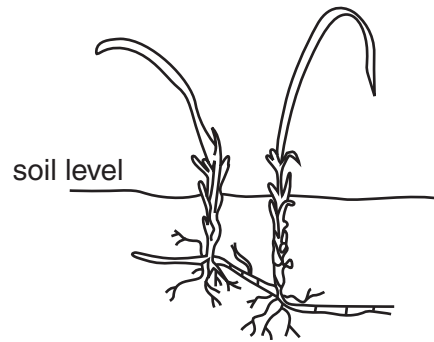


Which **one** of the following plants reproduces using bulbs?

- A potato
- B ginger
- C onion
- D strawberry

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

- 4 This plant reproduces using rhizomes.



Which **one** of the following statements about a rhizome is correct?

- A It produces genetically different offspring.
- B It grows overground.
- C It grows underground.
- D It produces small bulblets.

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

5 The photographs show three different machines used in plant cultivation.



plough



boom sprayer



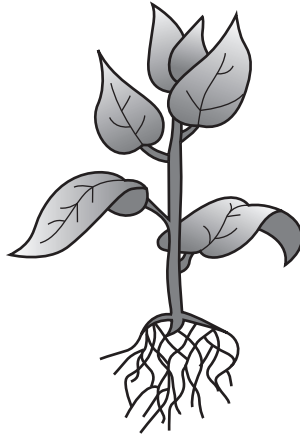
harrow

Complete the table to match each machine to its use.

applying fertiliser	providing a good soil structure for sowing seeds	turning the soil over to bury weeds

[2]

6 The diagram shows a plant that is lacking a major nutrient.



a plant with purple leaves and short roots

Which nutrient is lacking?

- A K
- B Mg
- C N
- D P

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

7 The photograph shows tomatoes being grown in a greenhouse.



Conditions inside a greenhouse are controlled.

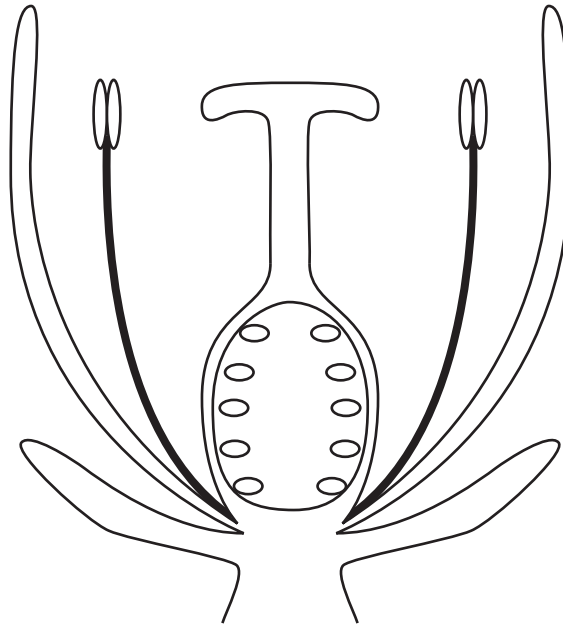
The conditions can be altered artificially.

Which one of the following statements is **not** correct?

- A More light can increase the rate of photosynthesis.
- B More nutrients can increase the yield of tomatoes.
- C More ventilation can increase oxygen for photosynthesis.
- D More wind can increase the efficiency of pollination.

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

8 The diagram shows a flowering plant.



- (a) Write an **S** on the diagram to indicate the structure which the pollen tube grows down. [1]
- (b) Write a **P** on the diagram to indicate the structure that is brightly coloured to attract insects. [1]

9 Janet has noticed that her house plants are not looking very healthy.

The leaves:

- are wilting (drooping)
- are turning yellow
- are not growing.

Suggest **two** things she could do to improve the health of her plants.

1

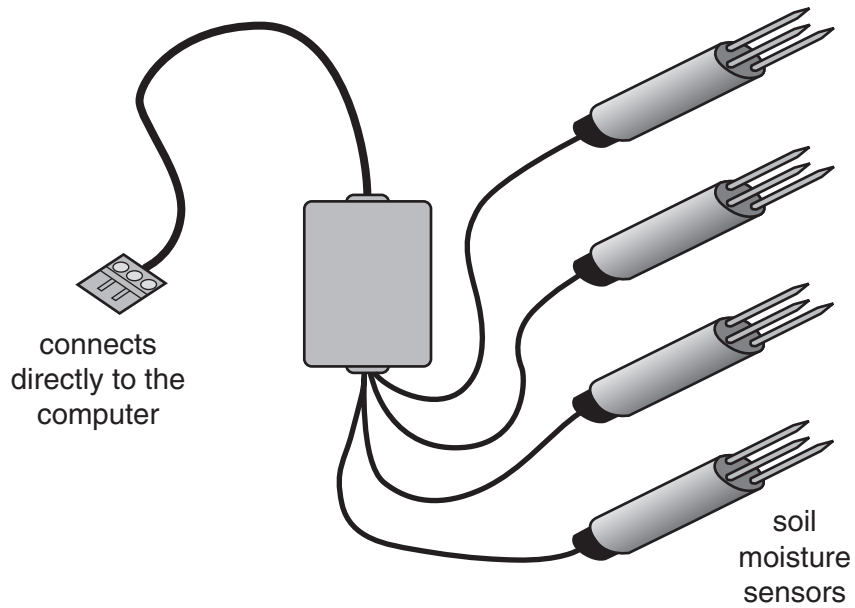
.....

2

..... [2]

10 ICT can be used to control the growing conditions in a glasshouse.

The diagram shows a device which can be used to monitor the moisture content of the soil.



The sensors are placed in the soil around the plants in the greenhouse.

Explain how the sensors ensure that all the plants receive the correct amount of water.

.....

.....

..... [2]

11 The photograph shows a germination table.

Scientists use this table to investigate the conditions needed for germination.



State **three** conditions needed for seed germination.

- 1
- 2
- 3 [2]

12 Susan has a problem with slugs in her garden.

She has some slug pellets.

The photograph shows her spreading the pellets.



Name **two** possible hazards shown in the photograph.

1

2 [2]

13 The table shows some information about different types of fertilisers.

name	type	nutrient release	% N	% P	% K
chicken manure	organic	slow	6.0	5.0	3.0
bone meal	organic	slow	4.0	20.0	0.0
farmyard manure	organic	slow	5.0	0.25	0.5
leaf mould	organic	slow	0.5	0.25	0.25
growmore	inorganic	quick	7.0	7.0	7.0
potassium nitrate	inorganic	quick	15.0	0.0	10.0
phostrogen	inorganic	quick	10.0	10.0	27.0

Use information from the table to answer the following questions.

(a) State one difference between **these** organic and inorganic fertilisers.

..... [1]

(b) Which inorganic fertiliser contains the smallest percentage of **N, P, K** overall?

..... [1]

(c) A farmer wants to add an 'all-purpose' **organic** fertiliser to the soil.

Which one would you recommend?

Explain your answer.

.....

 [2]

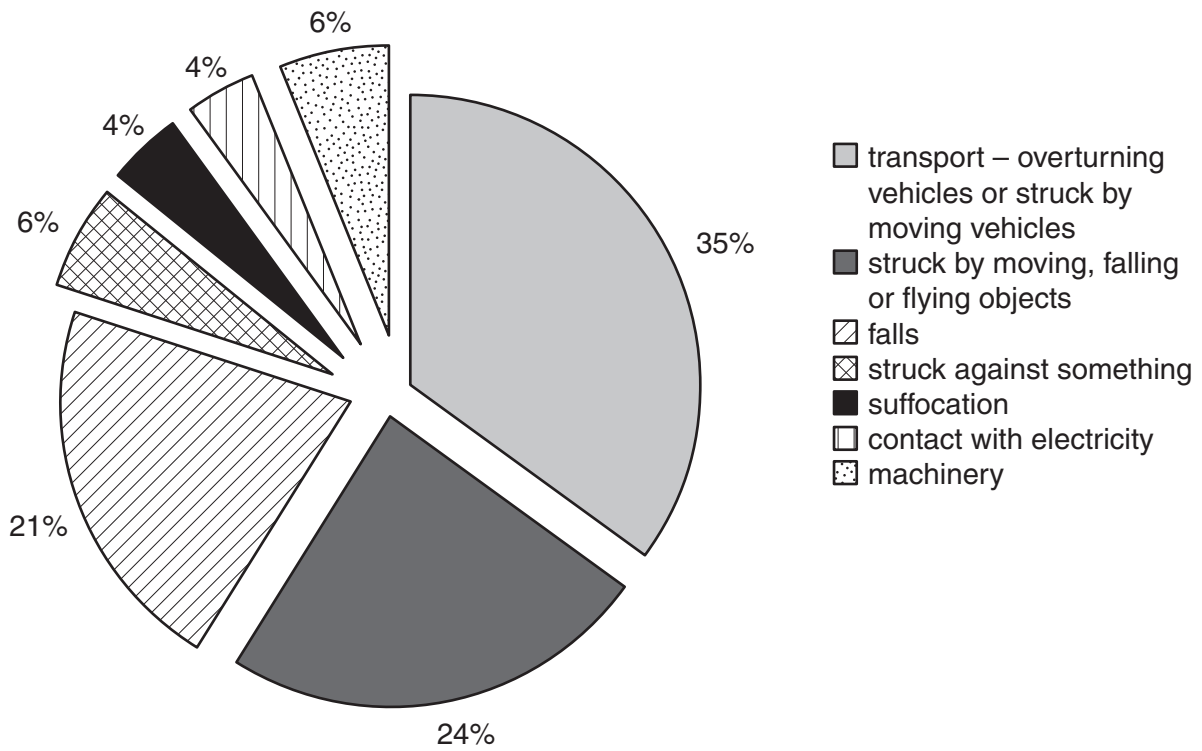
- 14 The table shows the number of fatal injuries that occurred in different land-based industries in 2004.

type of activity	number of fatal injuries
arable farming	2
mixed farming	21
forestry	6
horticulture	1
cattle (dairy and beef)	3
agricultural contractors	7
total	40

Calculate the number of fatal injuries that occurred in arable farming **and** horticulture combined as a percentage of the total injuries.

answer [1]

15 The pie chart shows the cause of fatal injuries in land-based industries in 2008.



(a) Which activity caused the greatest number of fatal injuries?

.....

[1]

(b) 50 people died in 2008 whilst working in a land-based industry.

How many were struck by moving, falling or flying objects?

.....

[1]

16 The photograph shows a garden rake.



State **two** uses of a garden rake in soil cultivation.

1

2 [2]

17 The photograph shows containers used for storing grain.



The containers are large so that they can store a lot of grain.

State **two** other features of a container that make it good for its purpose.

Give reasons for your answers.

.....

.....

.....

..... [3]

18 Flowering plants use sexual reproduction to form seeds.

This involves two stages:

- pollination
- fertilisation.

Describe the process of **pollination** in flowering plants.

.....

.....

.....

.....

..... [3]

