AQA GCSE Biology | 8461

SPECIFICATION POINT 4.5.4.2

Use of plant hormones (HT only)

Past-paper questions

Tier	**Higher**
Question groups	**6**
Available paper years	**2013–2024**

Using this booklet

1. Answer the questions in order and show your working.
2. Original question numbers and marks are retained.
3. Print at actual size (100%) for measuring questions.
4. Use the companion answer booklet to check your work.

Name: _____ **Date:** _____

Whole questions are retained for context, so some parts assess other specification points. Current and legacy sources are labelled. Continue on extra paper if needed.

4.5.4.2 Use of plant hormones (HT only)

Question 01

June 2013 | BL1HP | Original Q5 | Legacy

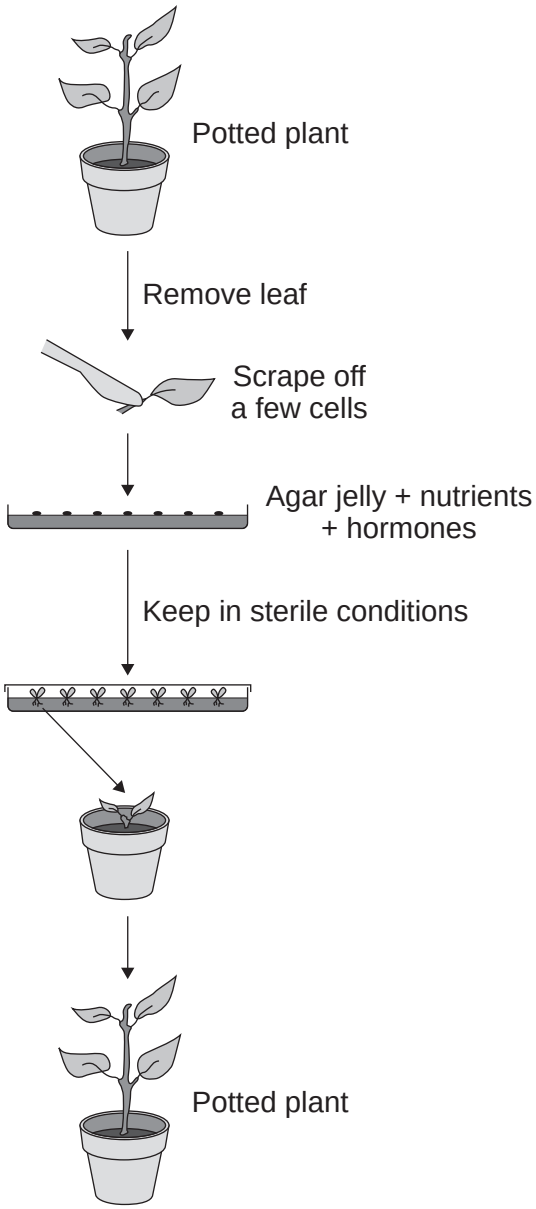
5 Plant hormones are used in horticulture.

5 (a) Name **one** plant hormone.

.....

(1 mark)

5 (b) The diagram shows how new plants are produced using tissue culture.



4.5.4.2 Use of plant hormones (HT only)

Question 01 · continued

5 (b) (i) Tissue culture is a type of *asexual reproduction*.

Give the main features of *asexual reproduction*.

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(3 marks)

5 (b) (ii) Another method of producing new plants is by taking cuttings.

Suggest **one** advantage of using tissue culture and **not** using cuttings to produce plants.

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(1 mark)

5

4.5.4.2 Use of plant hormones (HT only)

Question 02

3 Gardeners sometimes use weed killers to control the growth of plants.

3 (a) A gardener wanted to get rid of daisy plants growing in a lawn.

The gardener investigated the use of a weed killer.

The gardener:

- recorded the number of daisy plants growing in different 10 m^2 areas of the lawn
- made solutions of the weed killer (each solution had a different concentration)
- put 5 dm^3 of each solution on different 10 m^2 areas of the lawn
- recorded the number of daisy plants growing in each area after 2 weeks.

Table 2 shows the results.

Table 2

Concentration of weed killer in arbitrary units	Number of daisy plants per 10 m^2	
	Before using weed killer	2 weeks after using weed killer
0 (water)	8	8
20	6	8
40	9	6
60	5	2
80	4	0
100	8	0

3 (a) (i) To make the investigation fair, the gardener controlled some variables.

Give **one** variable the gardener controlled in the investigation.

[1 mark]

.....

.....

3 (a) (ii) The gardener decided that the result for a concentration of 20 arbitrary units of weed killer was anomalous.

Suggest why the gardener decided this result was anomalous.

[1 mark]

.....

.....

4.5.4.2 Use of plant hormones (HT only)

Question 02 · continued

3 (a) (iii) Why did the gardener put 0 arbitrary units of weed killer on one area of the lawn?

[1 mark]

.....

.....

3 (a) (iv) The gardener concluded that the best concentration of weed killer to use all over a lawn is 100 arbitrary units.

Suggest why the gardener cannot be sure about this conclusion.

[1 mark]

.....

.....

Question 3 continues on the next page

4.5.4.2 Use of plant hormones (HT only)

Question 02 · continued

3 (b) **In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.**

Plants respond to different environmental factors.

Describe how different environmental factors affect:

- the direction of growth of roots
- the direction of growth of shoots.

In your answer you should refer to the role of plant hormones.

Do **not** refer to the artificial use of plant hormones by gardeners or scientists.

[6 marks]

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Extra space .....

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10

4.5.4.2 Use of plant hormones (HT only)

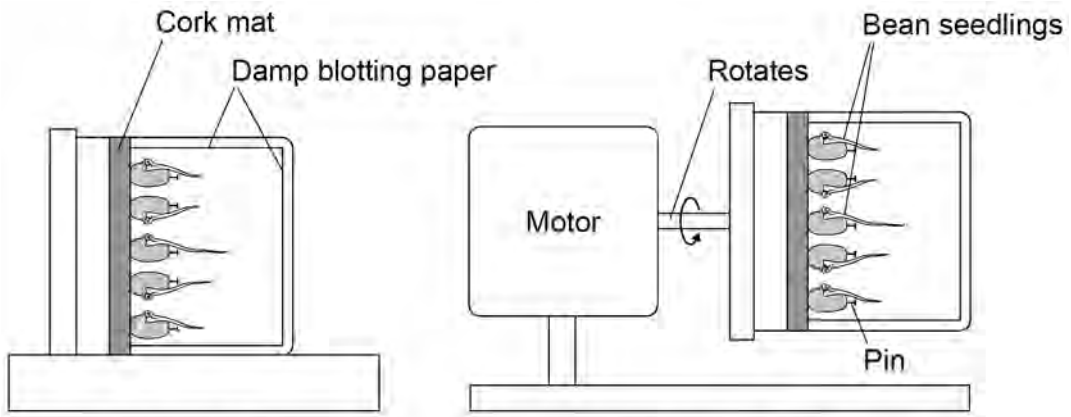
Question 03

June 2018 | 8461/2H | Original Q6

0 6 Some students investigated geotropism in the roots of bean seedlings.

Figure 6 shows the apparatus used.

Figure 6



This is the method used.

1. Measure the length of the root of each of 10 bean seedlings.
2. Pin 5 seedlings to the cork mat in apparatus **A**.
3. Pin 5 seedlings to the cork mat in apparatus **B**.
4. Leave **A** and **B** in a dark cupboard for 2 days.
5. After the 2 days:
   - make a drawing to show the appearance of each seedling
   - measure the length of the root of each seedling.

0 6 . 1 Why did the students surround the seedlings with damp blotting paper?

[1 mark]

Tick **one** box.

To prevent light affecting the direction of root growth ☐

To prevent photosynthesis taking place in the roots ☐

To prevent the growth of mould on the roots ☐

To prevent water affecting the direction of root growth ☐

4.5.4.2 Use of plant hormones (HT only)

Question 03 · continued

Apparatus **B** is a control.

Apparatus **B** rotates slowly.

0 6 . 2 How does apparatus **B** act as a control?

[1 mark]

Table 4 shows the students' results.

Table 4

	Apparatus A					Apparatus B				
Seedling number	**1**	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
Length at start in mm	35	41	32	33	39	30	33	29	28	31
Length after 2 days in mm	49	57	43	45	54	45	45	44	29	44
Length change in mm	14	16	11	12	15	15	12	15	1	13
Mean length change in mm	14					11				

0 6 . 3 One student stated:

'The mean length change for the seedlings in apparatus **B** is **not** valid.'

Suggest the reason for the student's statement.

[1 mark]

0 6 . 4 Suggest **one** improvement the students could make to obtain a more valid mean length change for the seedlings in apparatus **B**.

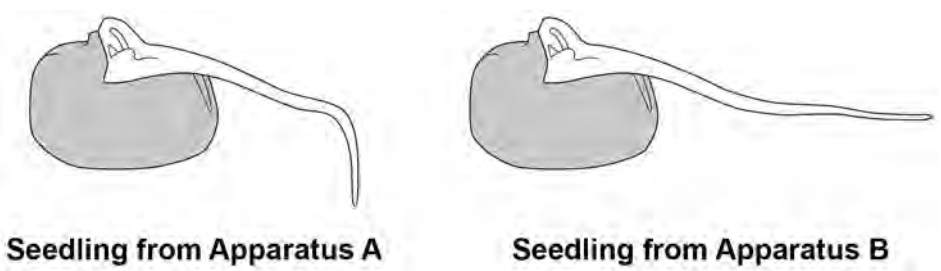
[1 mark]

4.5.4.2 Use of plant hormones (HT only)

Question 03 · continued

0 6 . 5 **Figure 7** shows the students' drawings of two seedlings at the end of the 2 days.

Figure 7



Seedling from Apparatus A

Seedling from Apparatus B

A plant hormone is made in the root tip.

The hormone diffuses from the tip into the tissues of the root.

Explain how the hormone causes the appearance of the seedlings in **Figure 7** to be different.

You should refer to **both** seedlings in your answer.

[3 marks]

4.5.4.2 Use of plant hormones (HT only)

Question 03 · continued

0 6 . 6 In horticulture plant hormones are used for controlling plant growth.

Draw **one** line from each plant hormone to the correct use of that hormone.

[3 marks]

Plant hormone	Use of hormone
	To reduce the time taken for tomatoes to ripen
Auxin	To slow down the growth of plant stems
Ethene	To promote seed germination
Gibberellin	To stimulate root growth in plant cuttings

10

4.5.4.2 Use of plant hormones (HT only)

Question 04

November 2020 | 8461/2H | Original Q3

0 3 This question is about plant hormones.

0 3 . 1 Farmers can spray seeds with gibberellins to start germination.

What are **two** other uses of gibberellins?

[2 marks]

Tick (✓) **two** boxes.

- To help in tissue culture ☐
- To help roots form ☐
- To increase fruit size ☐
- To kill weeds ☐
- To promote flower production ☐

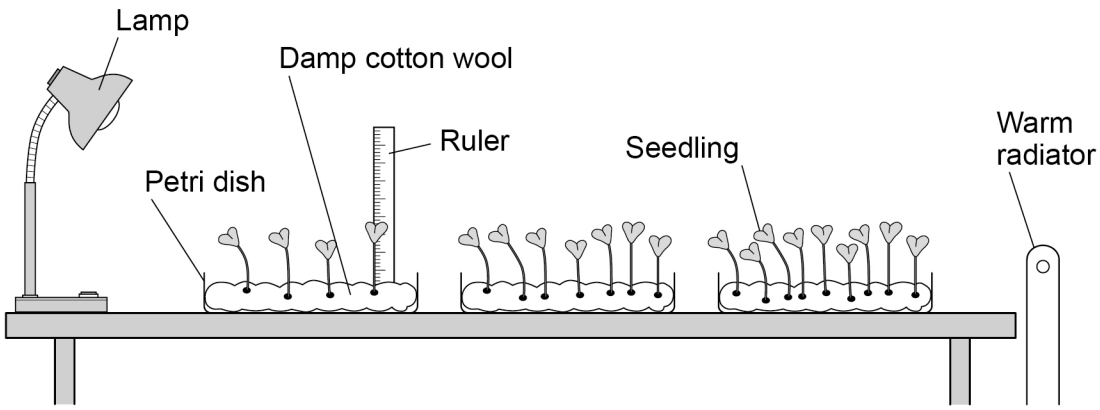
4.5.4.2 Use of plant hormones (HT only)

Question 04 · continued

Students investigated the effect of light intensity on the height of seedlings.

Figure 3 shows the equipment.

Figure 3



0 3 . 2 Describe **two** improvements the students should make to their investigation.

[2 marks]

1 _____

_____

2 _____

_____

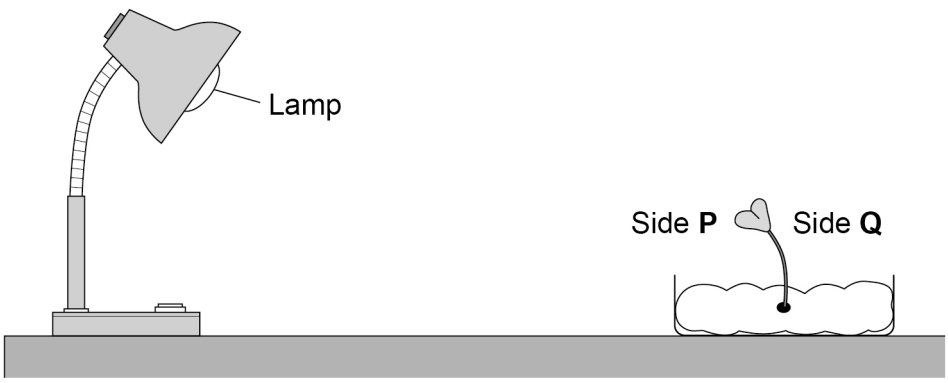
Question 3 continues on the next page

4.5.4.2 Use of plant hormones (HT only)

Question 04 · continued

Figure 4 shows a seedling growing towards a lamp.

Figure 4



0 3 . 3 Suggest how the students measured the length of the curved seedling in **Figure 4**.

[1 mark]

4.5.4.2 Use of plant hormones (HT only)

Question 04 · continued

0 3 . 4 Explain what happened to the growth of the seedling on side **Q** compared with the growth on side **P**.

[3 marks]

0 3 . 5 Bananas are often stored separately from other fruits because bananas release a plant hormone.

Why does storing bananas with other fruits cause the other fruits to ripen faster?

[1 mark]

9

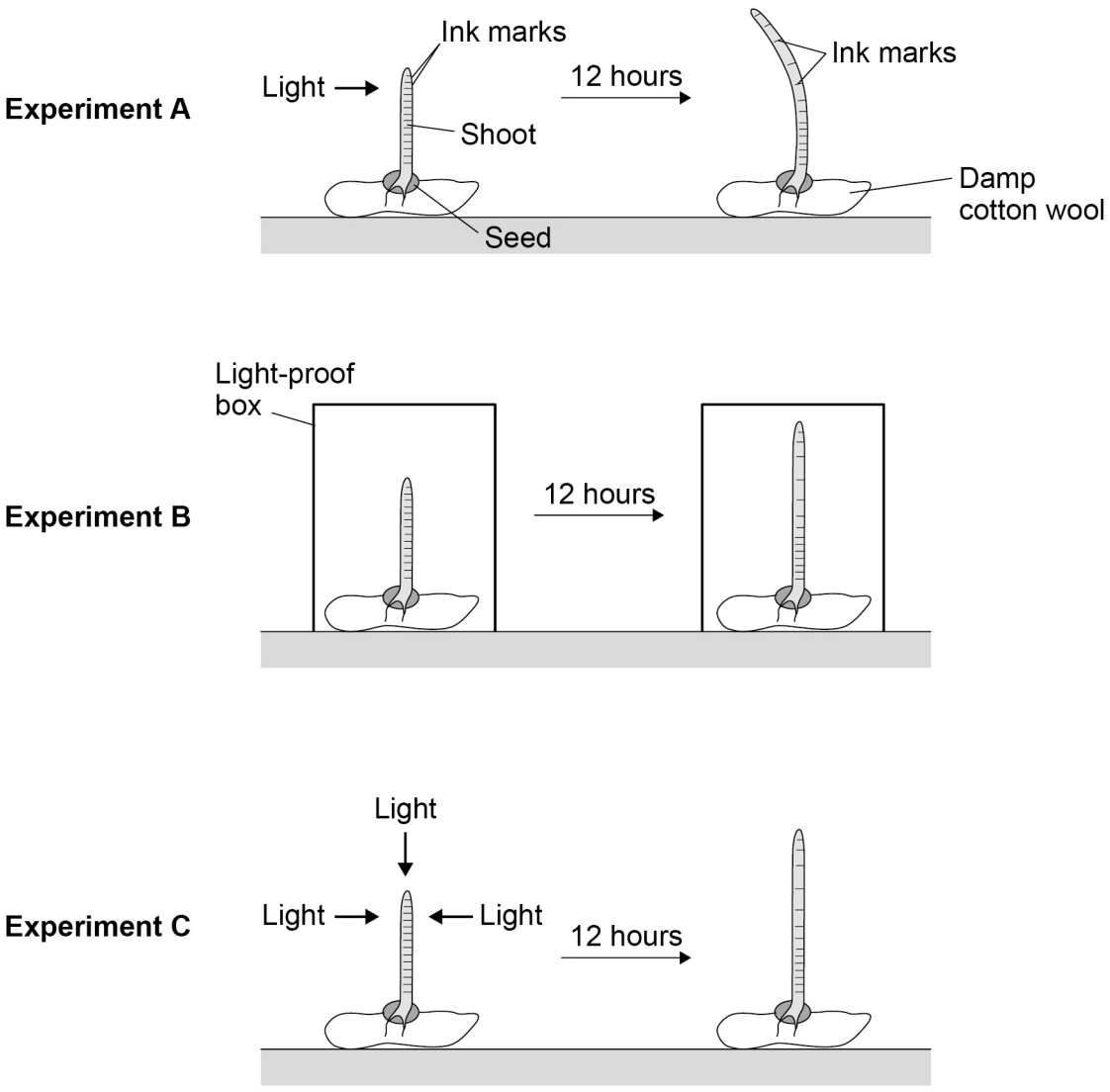
4.5.4.2 Use of plant hormones (HT only)

Question 05

0 9 Students investigated the response of plant shoots to one-sided light.

Figure 13 shows how the students set up three experiments.

Figure 13



4.5.4.2 Use of plant hormones (HT only)

Question 05 · continued

0 9 . 1 Suggest **two** control variables the students should have used in their investigation.

[2 marks]

1 _____

_____

2 _____

_____

0 9 . 2 Describe how experiment **B** and experiment **C** acted as controls for the investigation.

[2 marks]

Experiment **B** _____

_____

Experiment **C** _____

_____

0 9 . 3 Give **two** conclusions that the students could make from the **ink marks** on the shoot in experiment **A**.

[2 marks]

1 _____

_____

2 _____

_____

0 9 . 4 Name the type of response shown by the seedling in experiment **A**.

[1 mark]

_____

Question 9 continues on the next page

Question 05 · continued

Auxin is a plant hormone. Auxin is made in the shoot tip.

Scientists investigated the role of auxin in the response of shoot tips to light.

This is the method used.

1. Grow four seedlings in the dark for a few days.

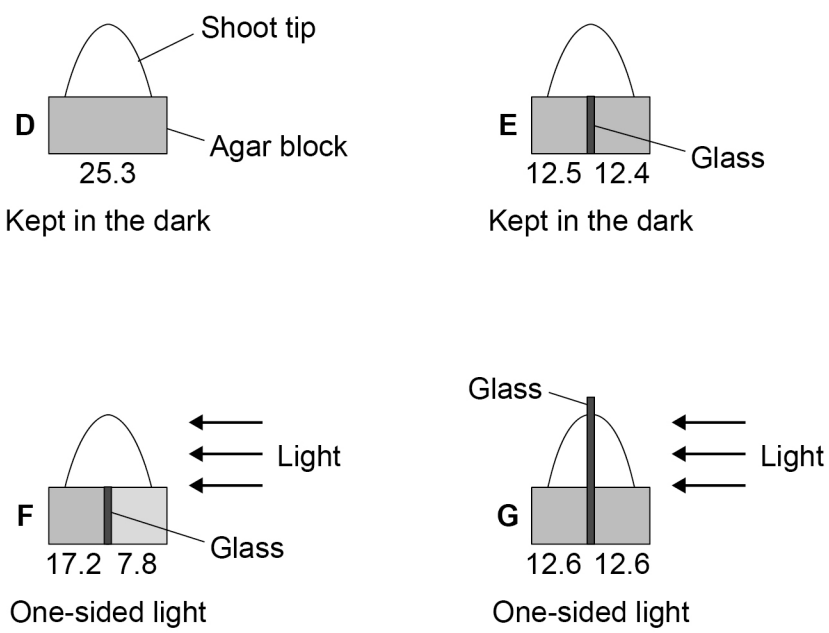
2. Cut the tip off the shoot of each seedling.

3. Place each shoot tip on a small block of agar jelly.

4. Place the shoot tips and agar in different conditions as shown in **Figure 14**.

5. After 24 hours, measure the mass of auxin in the agar blocks.

Figure 14



The numbers under each block show the mass of auxin that diffused into the blocks from the shoot tips.

The mass of auxin is given in arbitrary units.

4.5.4.2 Use of plant hormones (HT only)

Question 05 · continued

0 9 . 5 A scientist made a hypothesis:

'Light causes auxin to move from the side of the shoot nearest to the light to the side furthest from the light.'

Describe the evidence from **Figure 14** which supports the hypothesis.

[3 marks]

0 9 . 6 Another scientist made a different hypothesis:

'Light causes the breakdown of auxin.'

Give the evidence from **Figure 14** that shows that auxin is **not** broken down by light.

[1 mark]

11

4.5.4.2 Use of plant hormones (HT only)

Question 06

0 4 A student investigated the effect of gravity on the growth of bean seedlings.

The student put ink marks on the root of each bean seedling.

Figure 5 shows a bean seedling with ink marks.

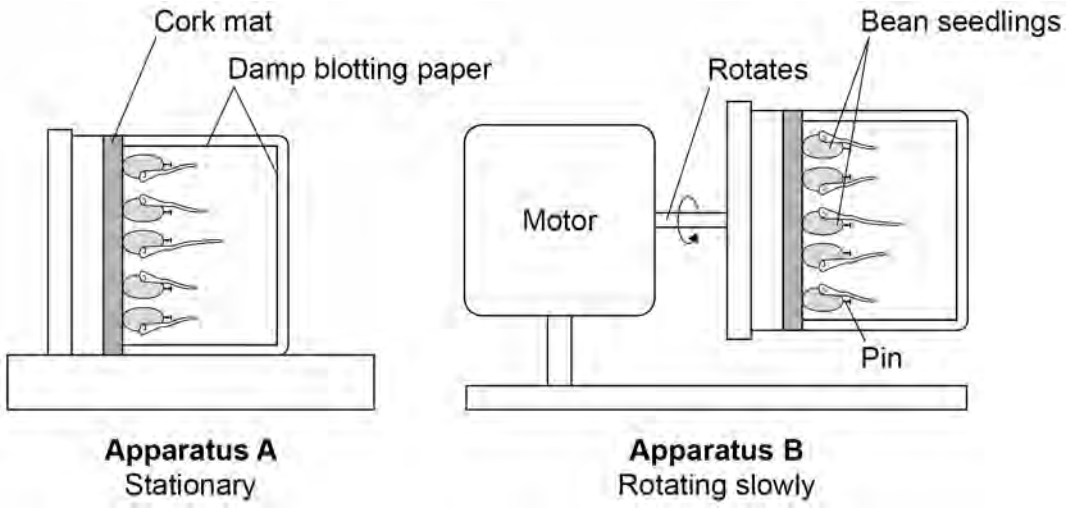
Figure 5



The student set up apparatus **A** and apparatus **B**.

Figure 6 shows both sets of apparatus.

Figure 6



The student left both sets of apparatus in a dark cupboard for 24 hours.

4.5.4.2 Use of plant hormones (HT only)

Question 06 · continued

0 4 . 1 Give the reason why the student placed both sets of apparatus in the dark.

[1 mark]

0 4 . 2 What are **two** reasons for surrounding the seedlings with damp blotting paper?

[2 marks]

Tick (✓) **two** boxes.

- To prevent photosynthesis in the roots ☐
- To prevent the growth of mould on the roots ☐
- To prevent water affecting the direction of root growth ☐
- To provide enough water for root growth ☐
- To provide the roots with mineral ions ☐

0 4 . 3 Apparatus **B** is a control.

Explain why apparatus **B** is needed.

[2 marks]

Question 4 continues on the next page

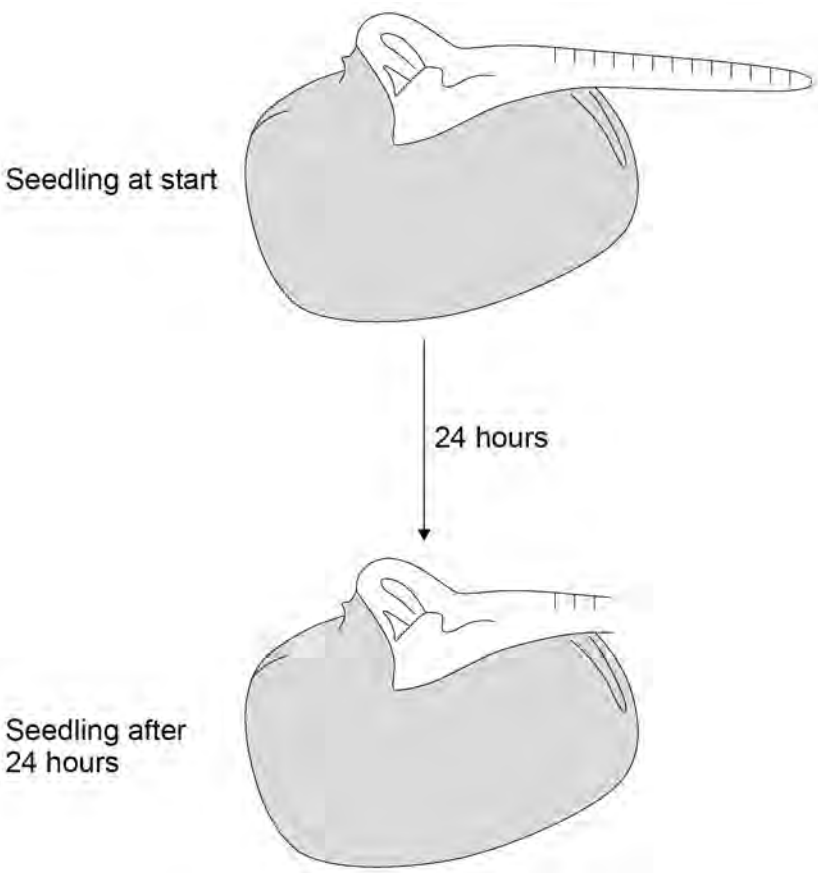
4.5.4.2 Use of plant hormones (HT only)

Question 06 · continued

0 4 . 4 **Figure 7** shows one seedling from apparatus **A** at the start of the investigation and after 24 hours.

The drawing of the seedling after 24 hours is **not** complete.

Figure 7



Complete **Figure 7** to show:

- the appearance of the root after 24 hours
- the ink marks on the root after 24 hours.

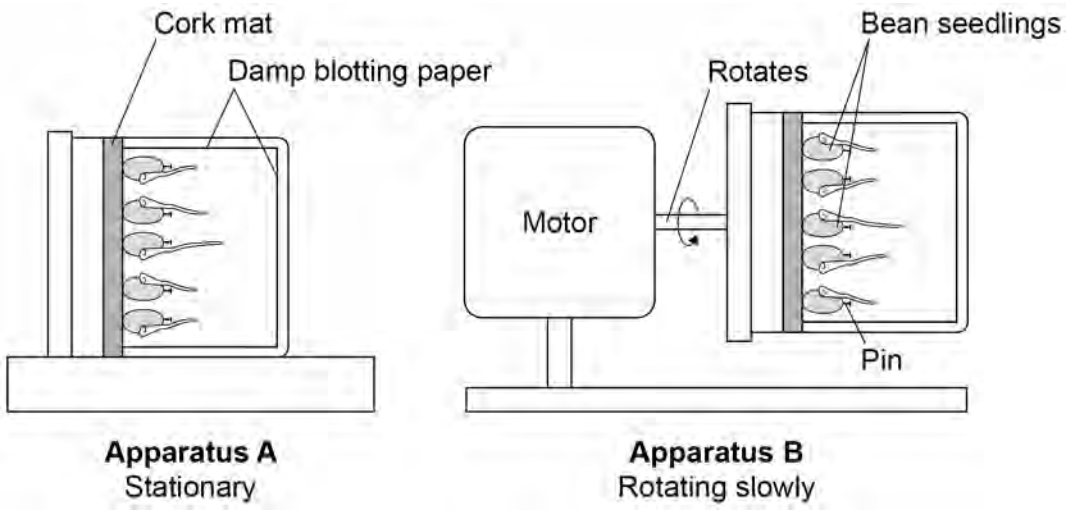
[3 marks]

4.5.4.2 Use of plant hormones (HT only)

Question 06 · continued

Figure 6 is repeated below.

Figure 6



The student left both sets of apparatus in a dark cupboard for 24 hours.

0 4 . 5 Describe how a root from apparatus **B** would look different from the root you drew in Question **04.4**.

[1 mark]

0 4 . 6 Auxin is a plant hormone.

Explain how auxin causes the results in apparatus **A**.

[2 marks]

Question 4 continues on the next page

4.5.4.2 Use of plant hormones (HT only)

Question 06 · continued

Farmers can use plant hormones to control the growth of plants.

0 4 . 7 Give **two** uses of auxin.

[2 marks]

1 _____

_____

2 _____

_____

0 4 . 8 A farmer sprayed an apple tree with gibberellin.

Suggest **two** reasons why the farmer sprayed the apple tree with gibberellin.

[2 marks]

1 _____

_____

2 _____

_____

15