

GCSE Biology (9 – 1)

Plant Hormones and Tropisms

Name:

Group:

Instructions

- Read each question carefully before you begin to answer it.
- Use black ink or black ball-point pen for your answers.
- Fill in the boxes at the top of this page with your name and group.
- Attempt to answer every question in the booklet.
- Answer the questions in the spaces provided – there may be more space than you need in some answer spaces.
- Calculators may be used for this booklet.
- For any calculations, you **must** show all your working.
- Any and all drawings or graphs should be completed in pencil.



For markers use	
Question	Mark
1	/5
2	/12
3	/10
4	/7
5	/6
6	/9
Total	/49
%	
Grade	

Information

- The maximum mark for this paper is 49 marks.
- The marks for each question are shown in brackets.
- Please be aware that good English and clear presentation are required in your answers.



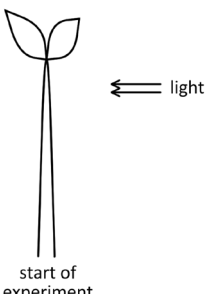
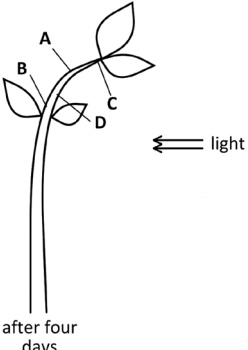
1. Plant hormones are chemical messengers that play a crucial role in coordinating a plant's growth and development, including its responses to environmental stimuli, known as tropisms.

Circle the letter of the correct answer for each question below.

- a) Which hormone is important in the fruit ripening process in plants?

A	B	C	D
Oestrogen	Progesterone	Ethene	Gibberellin
(1 mark)			

- b) In an experiment to investigate phototropism, a plant shoot is grown with light coming from one side only. After two days, in which region has the greatest rate of growth occurred?

			
A	B	C	D
(1 mark)			

- c) Plants growing in swamps have special roots that grow **upwards** through waterlogged soil to get oxygen from air. What type of response do these roots show?

A	B	C	D
Negative germination	Negative gravitropism	Positive gravitropism	Positive germination
(1 mark)			

- d) A plant nursery owner wants to encourage a batch of dormant seeds to germinate more quickly and uniformly. Which plant hormone would be most effective for this purpose?

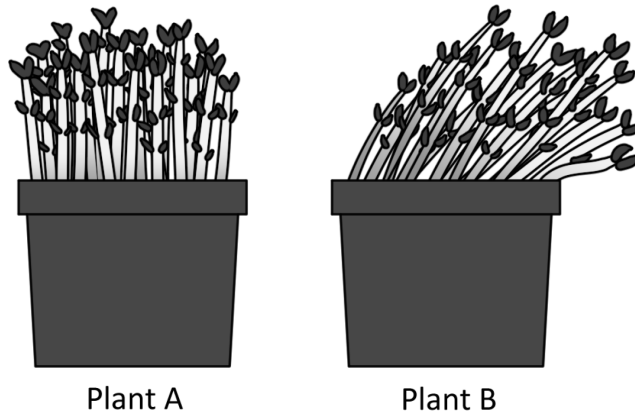
A	B	C	D
Ethene	Auxin	Gibberellin	Oestrogen
(1 mark)			

- e) A farmer notices that some of their stored apples are causing nearby unripe bananas to ripen much faster than expected. This accelerated ripening is primarily due to the release of which plant hormone?

A	B	C	D
Ethene	Auxin	Gibberellin	Oestrogen
(1 mark)			

(Total for Question 1 is 5 marks)

2. The figure below shows two plants that have been kept in different conditions.



a) State the location of the main light source in which plant A and plant B were kept.

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(2 marks)

b) What is the growth response shown by plant B?

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(1 mark)

c) Explain the advantage of this growth response to plant B.

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(2 marks)

d) Identify the plant hormone responsible for this growth and state where this hormone is produced in the plant.

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(2 marks)

- e) The plant hormone from part (d) controls the growth responses of the plants in the figure above. Explain how this hormone controls the growth response of the seedlings in plant B.

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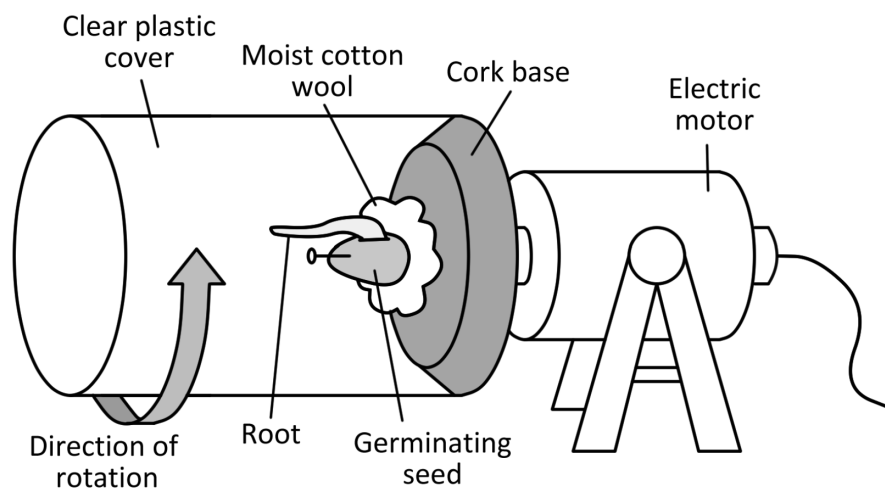
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(4 marks)

The figure below shows the apparatus used by another student to investigate the tropism of a different plant.



- f) When the apparatus rotates, the root grows horizontally. Which tropism is **not** showing its usual effect on the root?

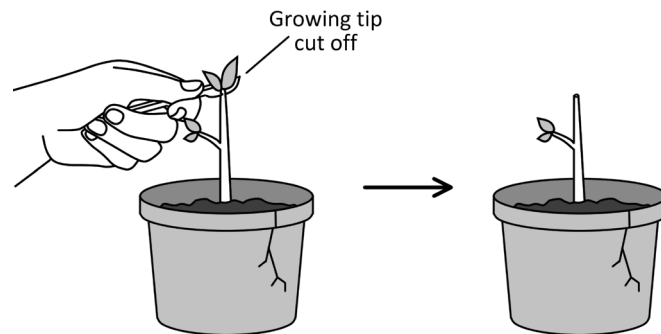
- A Positive gravitropism
- B Negative gravitropism
- C Positive phototropism
- D Negative phototropism

(1 mark)

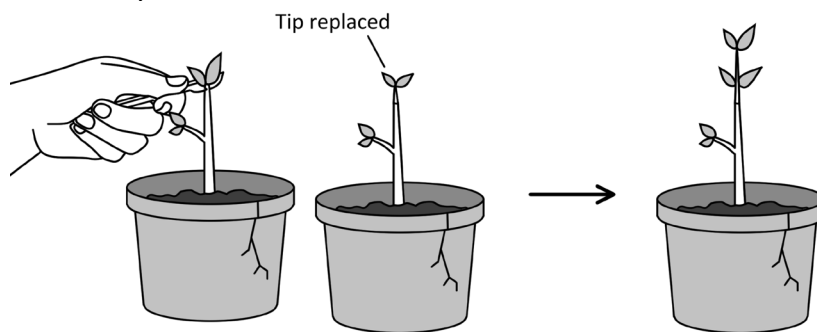
(Total for Question 2 is 12 marks)

3. A student did an experiment on the growth of plant shoots.
The figure below shows the apparatus used in the investigation.

Experiment 1: The tip of a shoot was removed from the plant. There was no growth in the shoot after 3 days.



Experiment 2: The tip of a shoot was cut off and then replaced back onto the same shoot. The shoot had grown 10 mm after 4 days.



- a) Describe the role of the shoot tip in enabling a plant to grow towards a light source.

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(2 marks)

- b) Give **one** variable that must have been controlled for the plant shoot to grow vertically, as shown in experiment 2.

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(1 mark)

- c) State **one** conclusion that can be drawn from these two experiments

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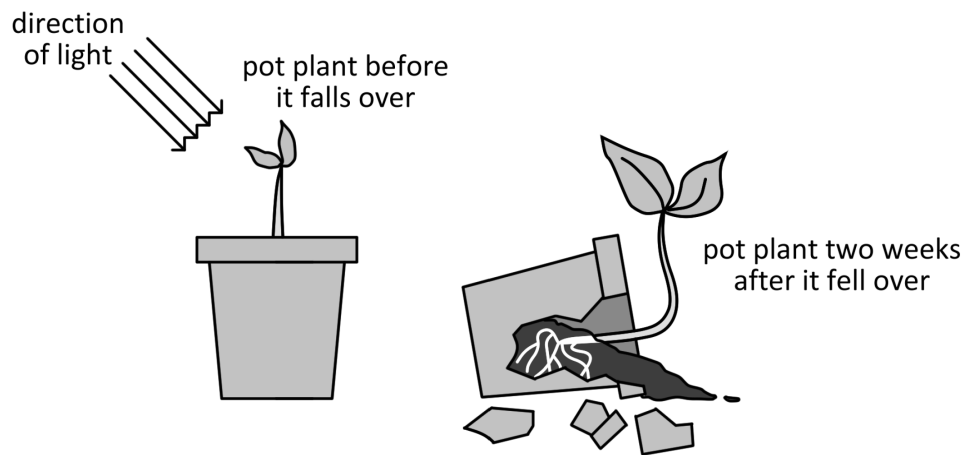
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(1 mark)

A person knocked over a potted plant in a garden and the pot broke. The plant was left where it fell for over three weeks.

The figure below shows the potted plant when it first fell and the same plant over three weeks later.



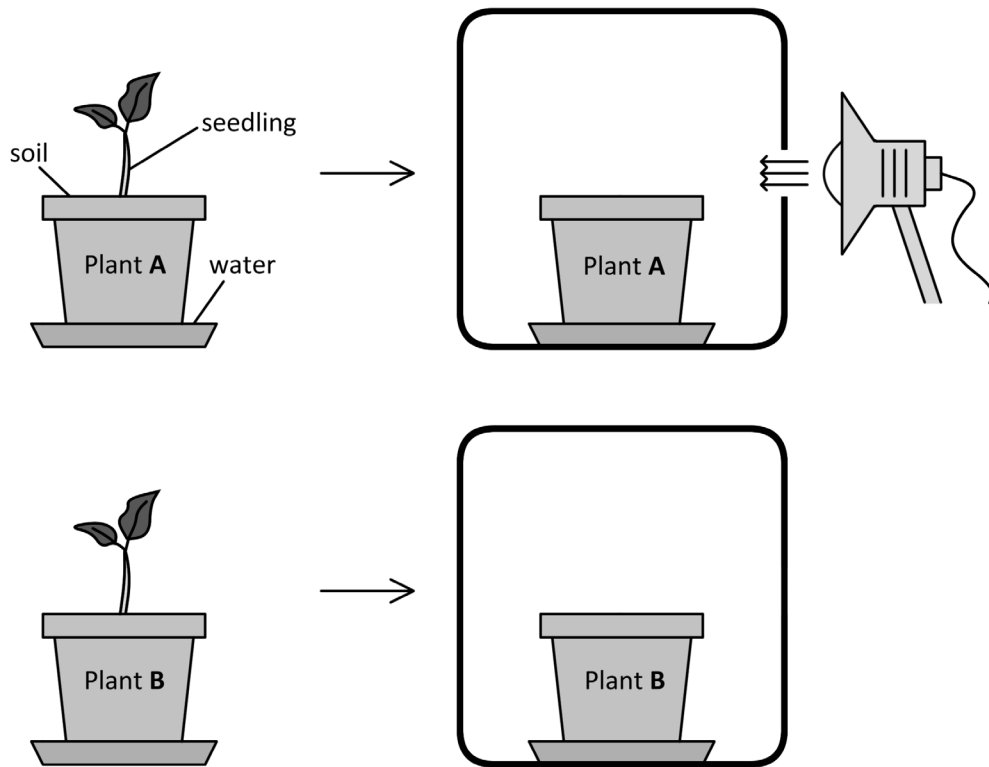
- d) Describe how plant hormones cause directional growth responses in both the shoots and roots of a plant.

[illegible]

(6 marks)

(Total for Question 3 is 10 marks)

4. A student set up an experiment to investigate the response of a growing plant to the direction of light. The figure below shows a **part drawn** setup used by the student.



Plant A was placed in a dark box that only allowed light to enter the box from one side.
Plant B was placed into a dark box that allowed **no** light to enter the box.

- a) Complete the figure above by **drawing** plant A and plant B, in the boxes, to show the expected direction of their growth after 10 days. (2 marks)

- b) Identify what response is being shown by plant A and why is this response an advantage to the plant?

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(2 marks)

- c) Name the hormones responsible for this response.

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(1 mark)

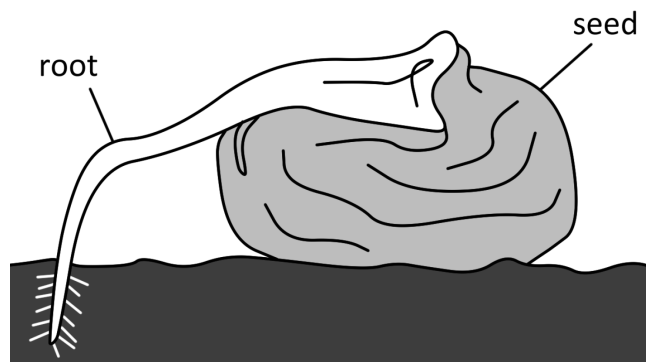
- d) What process occurs on the side of the plant **not** facing the stimulus?

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(2 marks)

(Total for Question 4 is 7 marks)

5. The figure below shows an seed lying on the soil, a root is beginning to emerge from the seed.



A hormone is made in the root tip of the plant.

The hormone moves through the plant tissues from the tip into the tissues of the root.

a) Identify the hormone and explain how the hormone causes the appearance of the root in the figure.

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(4 marks)

b) Gravitropism enables plants to survive in their environment.

Explain how gravitropism enables a plant to survive.

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(2 marks)

(Total for Question 5 is 6 marks)

6. Plants produce hormones that control and coordinate their growth and responses. These hormones also have important commercial uses.

Gardeners often take cuttings from plants to grow new, genetically identical plants. They sometimes dip the base of the cutting into rooting powder before planting it.

- a) Name the plant hormone that is the main active ingredient in rooting powder.

(1 mark)

- b) Explain why using rooting powder helps the cutting to grow successfully.

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(1 mark)

Gibberellins are another group of plant hormones.

- c) State one natural role of gibberellins in plants (other than stem elongation).

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(1 mark)

- d) Describe the commercial uses of the plant hormones auxin, gibberellin, and ethene in agriculture. For each hormone, give specific examples and explain how its use is beneficial.

(6 marks)

(Total for Question 6 is 9 marks)