

Chemical Control in Plants

Question Paper

Level	A Level
Subject	Biology
Exam Board	Edexcel
Topic	Control Systems
Sub Topic	Chemical Control in Plants
Booklet	Question Paper

Time Allowed: 48 minutes

Score: /40

Percentage: /100

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	77.5%	70%	62.5%	57.5%	45%	<45%

1 Plants can respond to environmental cues using IAA (auxin) and photoreceptors.

(a) A plant was kept in a cycle of 12 hours in the light and then 12 hours in the dark.
This plant did not flower.

It was then placed in an environment with 15 hours in the light and 9 hours in the dark. The plant then flowered.

Explain how this change in light conditions stimulated this plant to flower.

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(b) IAA in the stem of the plant is involved in phototropism.

(i) Give **three** similarities between IAA and animal hormones.

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- (ii) Auxins can be used to kill unwanted plants such as weeds growing in grass.
The auxin stimulate the weeds to grow rapidly.

Suggest an explanation for how auxins stimulate the weeds to grow rapidly
but not the grass.

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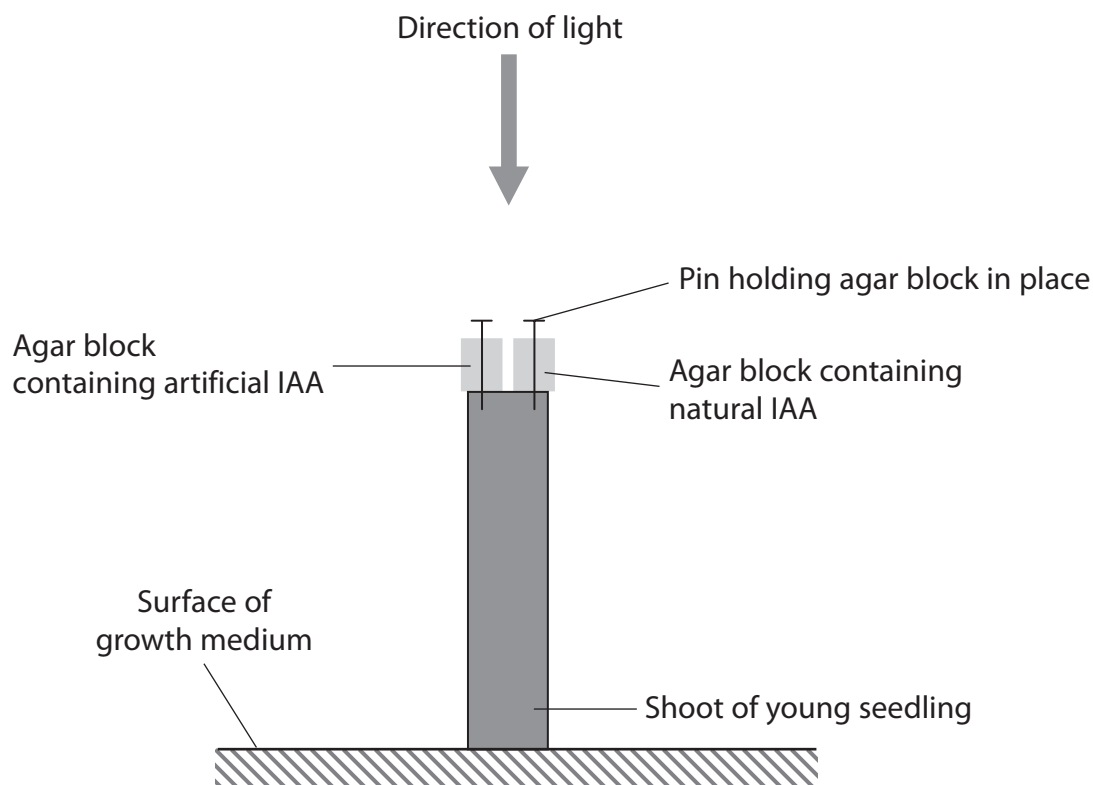
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(Total for Question 1 = 8 marks)

2 IAA (auxin) is a plant growth substance.

(a) A student investigated the effect of natural IAA and artificial IAA on shoot growth.

The diagram below shows how she set up her investigation.



(i) The student also set up a control.

Describe a suitable control for this investigation.

(1)

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- (ii) After 48 hours, the student recorded her observations of the growth of the shoots.
From her observations, she concluded that both natural and artificial IAA affected growth. She also concluded that the artificial IAA had a greater effect than the natural IAA.

Suggest what she recorded and explain how the IAA in the agar affected the growth of the shoot.

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- (b) IAA is known to bind to transcription factors.
Suggest how IAA can stimulate cells to synthesise proteins.

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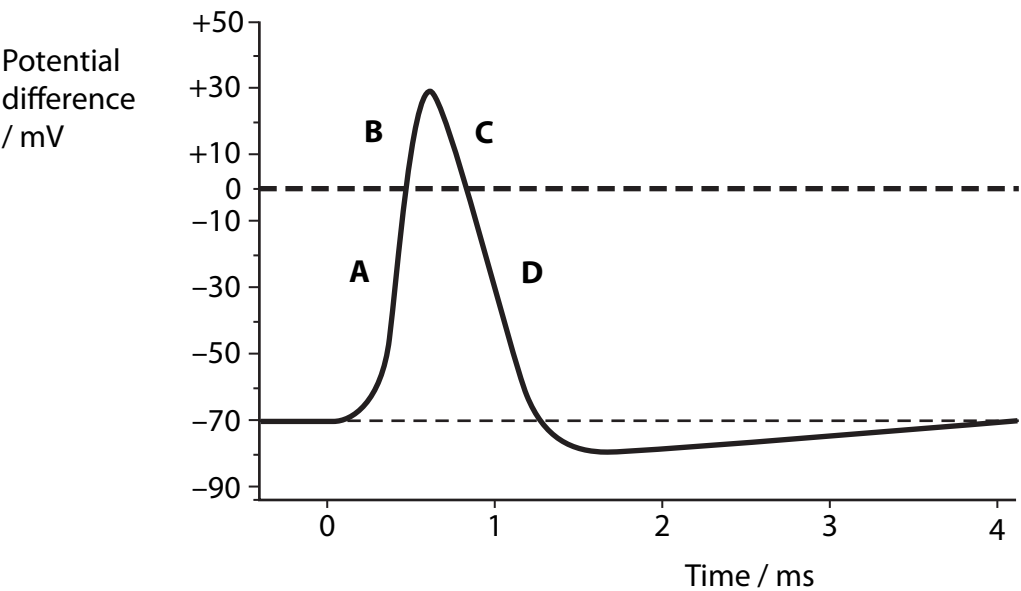
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3 The diagram below shows changes in potential difference across the membrane of a neurone during an action potential.



(a) Describe the events that begin the depolarisation of the membrane of a neurone.

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(b) Complete the table below to show which ions are able to move across the membrane at positions **A** and **D** shown in the diagram.

Put a cross ☒ in the box if the membrane is permeable to the ion.

(2)

Position on diagram	Permeable to sodium ions	Permeable to potassium ions
A	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
D	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

(c) Give an explanation for the movement of ions at position **C** on the diagram. (3)

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(d) Explain how the potential difference across the membrane is returned to the resting level in the time between 1.5 ms and 4.0 ms on the diagram. (3)

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(Total for Question 3 = 10 marks)

- 4 The nervous system is made up of many different neurones including those involved in reflex actions.

- (a) The table below shows features of three types of neurone in a spinal reflex. Place a cross ☒ in the box if the feature is present in any of the named neurones.

(4)

Feature	Type of neurone		
	Sensory	Relay	Motor
Found only in the central nervous system	☒	☒	☒
Cell terminates at the effector	☒	☒	☒
Pre-synaptic membrane not found in the central nervous system	☒	☒	☒
Impulse stimulated by the receptor	☒	☒	☒

- (b) Rod cells and muscle cells in the eye both require ATP.

- (i) Name the chemical reaction that occurs when ATP is broken down.

(1)

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- (ii) Describe the function of ATP in a rod cell soon after a person has moved from an area of bright light to an area of low light.

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(Total for Question 4 = 12 marks)