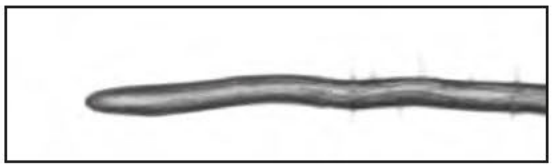
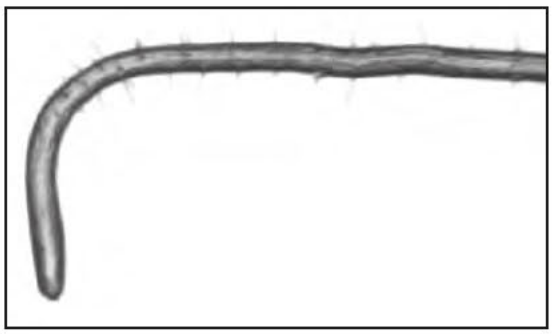
1 Photograph **A** shows the root of a plant when it was positioned horizontally.

The root was kept in the dark and left in this position.

Photograph **B** was taken three days later.



photograph **A**



photograph **B**

(a) (i) Complete the sentence by putting a cross (☒) in the box next to your answer.

The process that resulted in the type of root growth shown in photograph **B** is

(1)

- ☒ **A** negative gravitropism
- ☒ **B** negative phototropism
- ☒ **C** positive gravitropism
- ☒ **D** positive phototropism

(ii) Explain how this change in root growth has occurred.

(3)

(iii) Suggest the advantages to the plant of this response.

(2)

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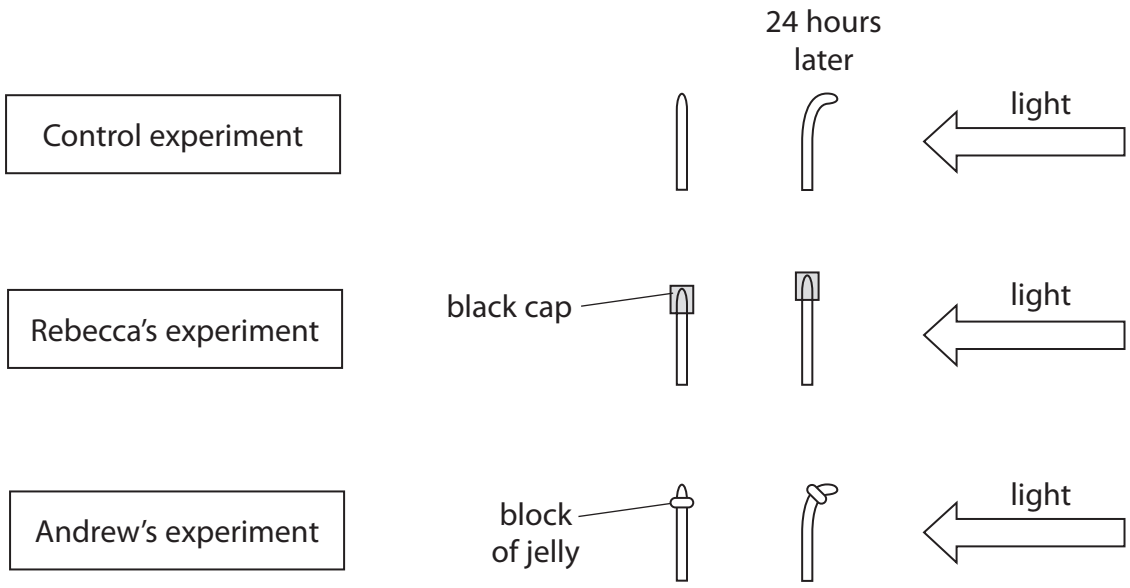
(b) Rebecca and Andrew each set up an experiment to investigate the effect of light on plant shoots.

They also set up a control experiment.

Rebecca placed a black cap over the tip of her plant shoot.

Andrew removed the tip from his plant shoot, placed a thin block of jelly on top of the plant shoot and then replaced the tip.

All three experiments were left for 24 hours.



(i) Suggest why Rebecca and Andrew set up a control experiment.

(1)

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(ii) Explain the results of Rebecca's experiment and Andrew's experiment.

(3)

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(Total for Question 1 = 10 marks)

2 A student wanted to investigate the effect of light on the growth of cress seedlings.

The student had three pots of seedlings grown in different conditions.

Pot A was placed in a window with light from one direction only.

Pot B was placed in a cupboard with no light.

Pot C was placed with light from above.

Figure 8 shows the seedlings at the end of the investigation.

(a) (i) Label the pots of cress seedlings A, B and C.

(2)



(Source: Nigel Cattlin/Science Photo Library)

Figure 8

(ii) What is the response shown by the cress seedlings in Pot A?

(1)

☒ **A** negative gravitropism

☒ **B** negative phototropism

☒ **C** positive gravitropism

☒ **D** positive phototropism

(iii) State the plant hormone that causes the cress seedlings to grow towards the light.

(1)

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(b) The student wanted to find out where the hormone that caused the response to directional light was found.

The student had two growing plant shoots and placed them both in a window with light coming from one direction.

Describe a method the student could use to show that the hormone was found in the tip of the plant shoot.

(2)

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(c) Figure 9 shows a cross section through a pine leaf.

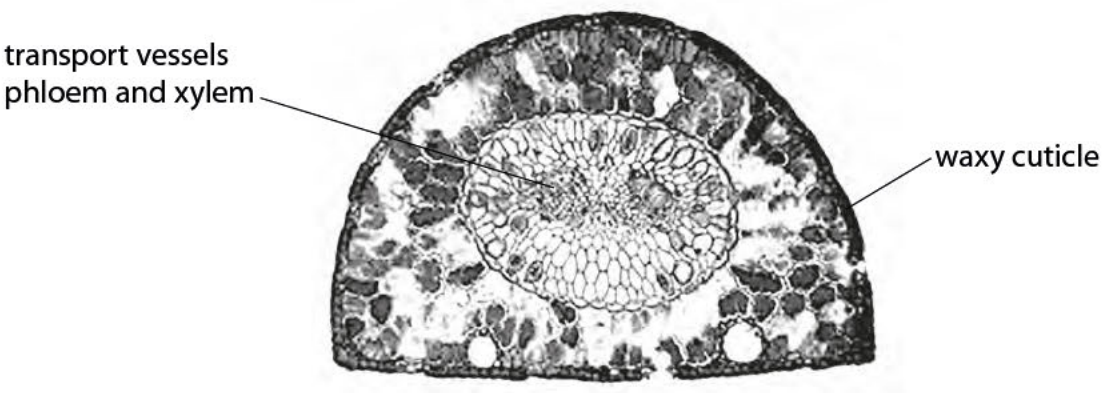


Figure 9

(i) Explain why the waxy cuticle is important for this pine leaf.

(2)

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(ii) The transport vessels are labelled on Figure 9.

Which row of the table is correct for the movement of sucrose through the plant?

(1)

	method of transport of sucrose through the plant	structure through which sucrose is transported
☒ **A**	transpiration	xylem
☒ **B**	transpiration	phloem
☒ **C**	translocation	xylem
☒ **D**	translocation	phloem

(Total for Question 2 = 9 marks)

3 Auxins are plant hormones.

(a) (i) Complete the sentence by putting a cross (☒) in the box next to your answer.

Auxins cause the shoot of a plant to grow towards light in a process called

(1)

- ☒ **A** negative gravitropism
- ☒ **B** negative phototropism
- ☒ **C** positive gravitropism
- ☒ **D** positive phototropism

(ii) Explain how auxins cause the shoot of a plant to grow towards light.

(2)

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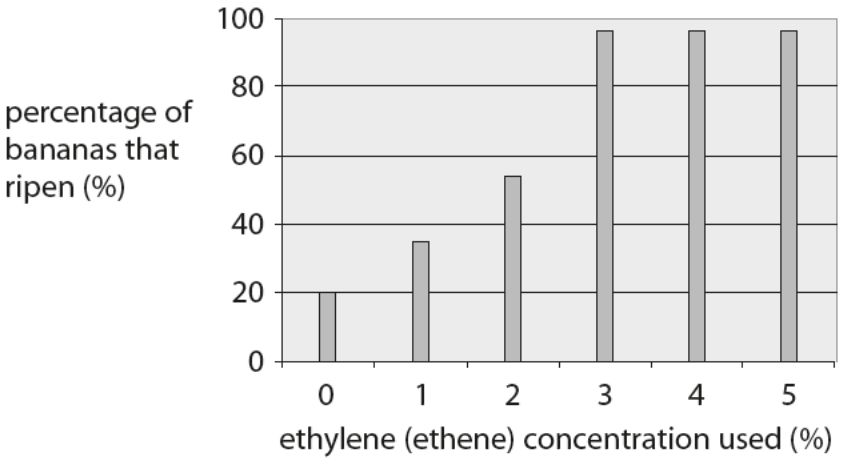
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(b) Ethylene (ethene) is a plant hormone that stimulates the ripening of fruit.

The graph shows the effect of ethylene (ethene) concentration on the ripening of bananas after three days.



(i) Describe the effect of ethylene (ethene) on the ripening of bananas.

(1)

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(ii) Explain which concentration of ethylene (ethene) a supermarket should use to be most cost effective when ripening bananas.

(2)

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*(c) Fruit ripening is one use of plant hormones.

Describe the other uses of plant hormones in crop production.

(6)

(Total for Question 3 = 12 marks)