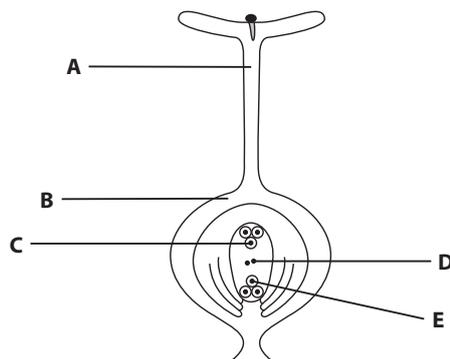


7 Pollen germination and pollen tube growth are important stages in plant sexual reproduction.

(a) The diagram below shows a pollen grain on the stigma of a flower.



- (i) On the diagram above, draw a line to show the route taken by the pollen tube, from the pollen grain to the micropyle. (2)
- (ii) The table below shows the structures labelled on the diagram. Place a tick (✓) in the box next to each one in which the chromosome number increases at fertilisation. (2)

Labelled structure	Tick (✓) if chromosome number increases at fertilisation
A	
B	
C	
D	
E	

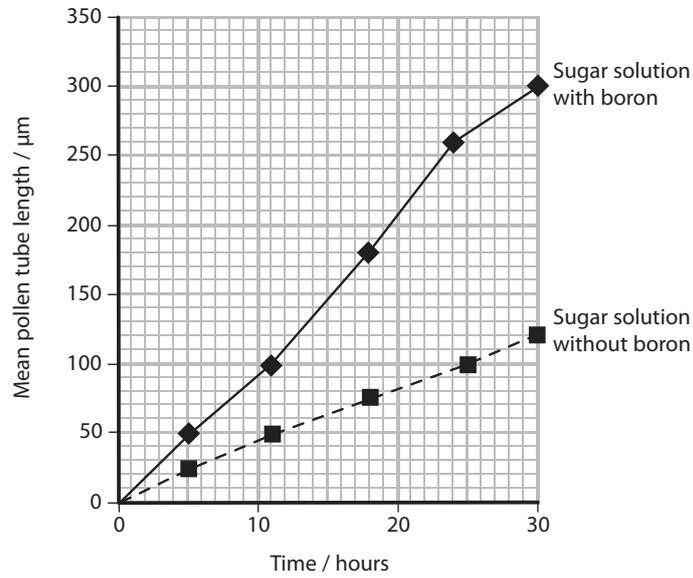


(b) An investigation was undertaken to study the effect of the element boron on the growth of pollen tubes.

A large number of pollen grains was placed in a dilute sugar solution. Every six hours, for 30 hours, 500 pollen grains were removed and the length of the pollen tube of each was measured. The mean length of the pollen tubes was then calculated.

This was repeated with boron added to the dilute sugar solution.

The results are shown in the graph below.



(i) Using the information in the graph, compare the mean pollen tube length in these two sugar solutions, over this 30-hour period.

(3)

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(ii) Using the result of this investigation, a student concluded that boron was necessary for pollen tube growth. Suggest why another student disagreed with this conclusion.

(1)

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(iii) Using the information in the graph, suggest an appropriate conclusion for the effect of boron on the rate of growth of pollen tubes.

(1)

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(iv) Suggest the advantages to flowering plants of increased pollen tube growth.

(2)

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**(Total for Question 7 = 11 marks)**

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