

AS Level Biology B

H022/02 Biology in depth

Question Set 6

1 A student was investigating the effect of sucrose concentration on plasmolysis in onion cells using the following procedure.

- Five Petri dishes were labelled **A** to **E**.
- Six drops of 0.2 mol dm^{-3} sucrose solution and two drops of differential stain were added to Petri dish **A**.
- A sample of epidermal tissue from an onion was placed in Petri dish **A**.
- The tissue sample was then removed immediately, placed on a microscope slide and viewed using a light microscope.
- The numbers of plasmolysed **and** unplasmolysed cells were counted.
- This was repeated for Petri dishes **B** to **E** using different concentrations of sucrose solution as shown in Table 1.

(a) (i) What is the purpose of the differential stain in **this** investigation?

[1]

(ii) The student made the following statement:

'The water potential of the onion cells changes when the cells are stained with the differential stain.'

Is this statement correct? Justify your answer.

[1]

(iii) Identify **two** sources of error in the procedure used **and** suggest an improvement for each.

error

improvement

error

improvement

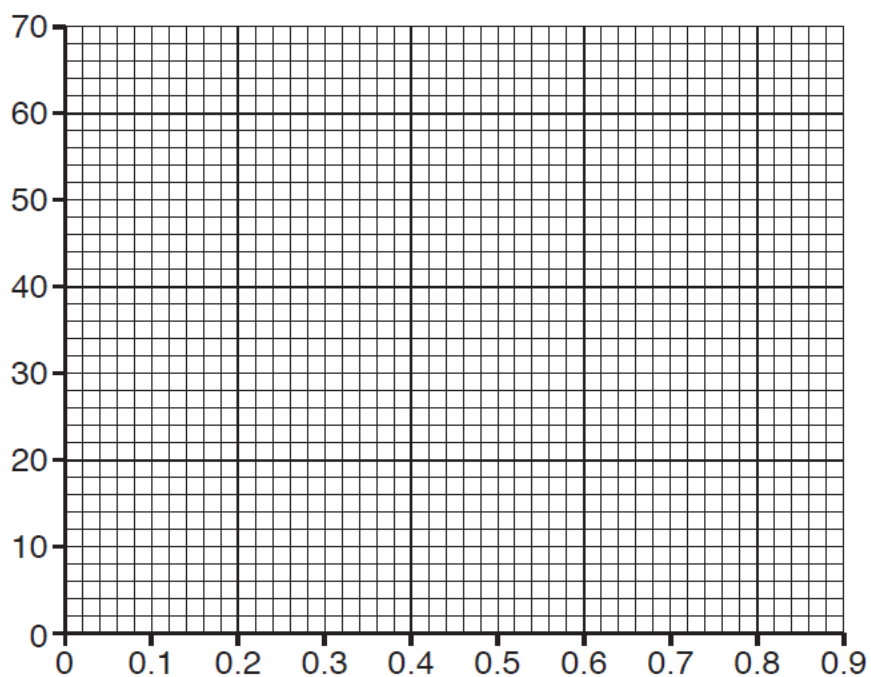
[4]

(b) The results of the student's investigation are shown in Table 1.

Petri dish	Sucrose concentration (mol dm ⁻³)	Number of plasmolysed cells	Number of unplasmolysed cells	Percentage of plasmolysed cells (%)
A	0.2	30	168	18
B	0.3	46	162	28
C	0.5	62	148	42
D	0.7	73	124	59
E	0.8	68	104	65

Table 1

(i) Using the data in Table 1, complete an appropriate graph on the grid provided.



[3]

(ii) Using your graph plotted in (b)(i), state the sucrose concentration at which 50% of the onion cells are plasmolysed.

[1]

- (c) Water must enter plants via the roots and move through the tissues to enter the xylem vessels.

On Fig. 1, **draw** the **apoplast** pathway taken by water from point **X** in the soil to point **Y** in the xylem.



Fig. 1

[2]

- (d) Complete the sentences below about the movement of water through xylem vessels.

As water molecules move through xylem vessels they are attracted to each other by forces. The water molecules are also attracted to the walls of the xylem vessel by forces.

The walls of the xylem vessel are strengthened by which is impermeable to water. The movement of water between xylem vessels can therefore only occur through pores, known as

[4]

Total Marks for Question Set 6: 16



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