

**A Level Biology B**

**H422/01** Fundamentals of biology

**Question Set 17**

1. (a) (i) An experiment was carried out to investigate osmosis in potato cells.

Six beakers were filled with distilled water and dissolved sucrose to produce six solutions ranging from 0.0 to 1.0 mol dm<sup>-3</sup> sucrose concentration.

A potato was peeled and cut into slices of exactly 2.50 g mass. Five slices were soaked in each sucrose solution for 30 minutes. The slices were then removed, briefly dried with tissue and weighed.

The final mass of each potato slice is shown in Table 33.

Sucrose concentration /mol dm <sup>-3</sup>	Final mass of potato slice /g						
	1	2	3	4	5	Mean	Standard deviation
0.0	2.78	2.74	2.79	2.80	2.89	2.80	0.06
0.2	2.66	2.58	2.61	2.64	2.66	2.63	0.03
0.4	2.44	2.47	2.45	2.50	2.43	2.46	0.03
0.6	2.38	2.29	2.36	2.34	2.29	2.33	
0.8	2.32	2.31	2.20	2.26	2.28	2.27	0.05
1.0	2.25	2.23	2.19	2.16	2.26	2.22	0.04

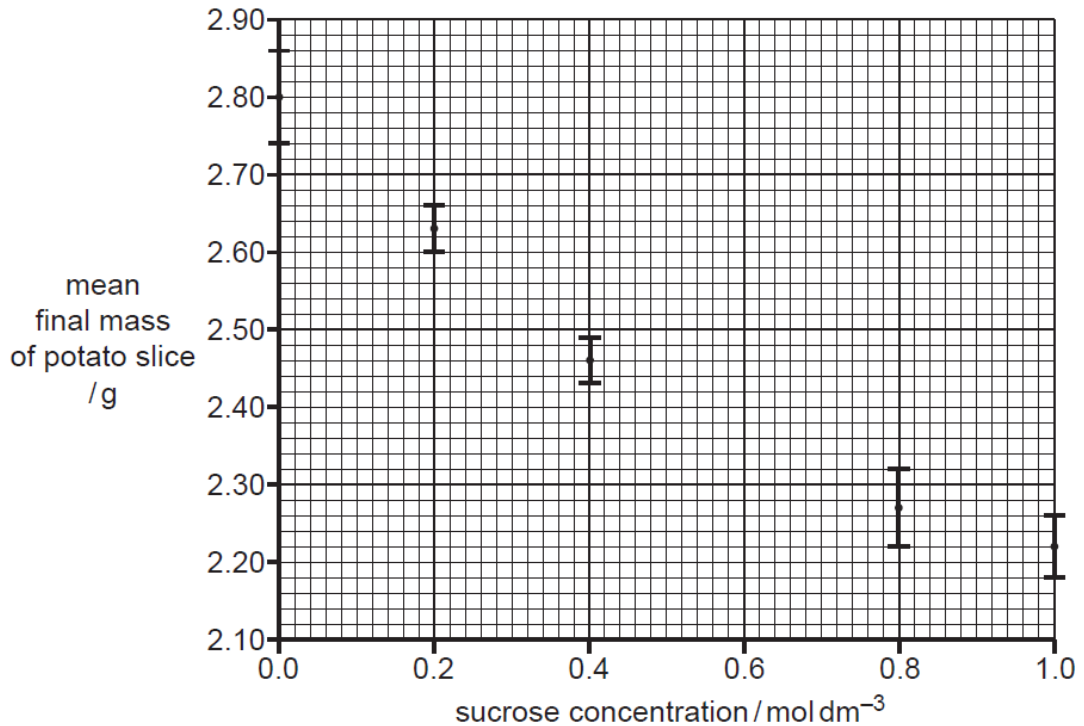
**Table 33**

Calculate the standard deviation for the final mass of potato slices soaked in 0.6 mol dm<sup>-3</sup> sucrose concentration.

Use the formula:  $s = \sqrt{\frac{\sum(x - \bar{x})^2}{n - 1}}$

[2]

(ii) The graph below represents the data in Table 33.



Complete the graph by plotting the data for the potato slices soaked in 0.6 mol dm<sup>-3</sup> sucrose using the data in Table 33 **and** the standard deviation calculated in (a)(i).

[2]

(iii) With reference to the data in Table 33, explain how the sucrose concentration of the solution determines the final mass of potato.

[3]

(iv) Suggest **two** factors in the method that could have contributed error to the data, as shown by the error bars in the graph in (a)(ii) on page 25.

[2]

(b) Osmosis can also be investigated on a single-cell scale with microscopy by measuring cell size.

Fig. 33 shows the view down a microscope fitted with a stage micrometer.

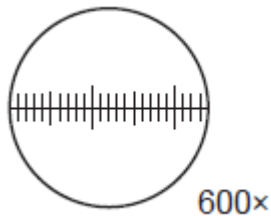


Fig. 33

Calculate the **area** of the field of view of the microscope set up as shown in Fig. 33.

Give your answer to the nearest whole number.

[2]

**Total Marks for Question Set 17: 11**

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