AS Level Biology B

H022/02 Biology in depth

Question Set 13

1 The structure of the monosaccharide fructose is shown below in Fig. 1.1.

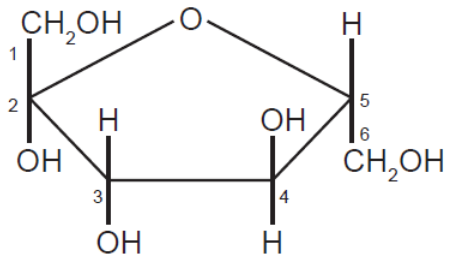


Fig. 1.1

(a) (i) Using Fig. 1.1, describe one **visible similarity** between fructose and α-glucose.

[1]

(ii) Using Fig. 1.1, describe one **visible difference** between fructose and α-glucose.

[1]

(b) Fructose and α-glucose can be joined together to make sucrose.

Sucrose produced in the leaves of a potato plant can be transported to the roots where it is converted into starch and stored.

Fig. 1.2 shows a leaf of a sweet potato plant in transverse section.

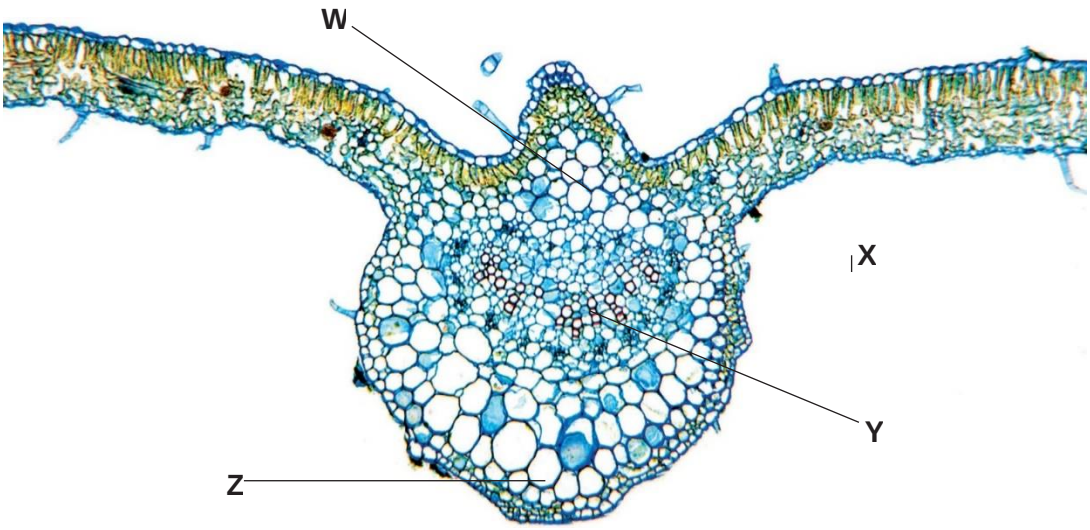


Fig. 1.2

(i) Through which of the tissues, labelled **W** to **Z** in Fig. 1.2, is sucrose transported?

[1]

(ii) The plant tissues in Fig. 1.2 have been stained.

State the type of stain and explain why it was used to prepare the slide.

[2]

(c) Starch can be hydrolysed using hydrochloric acid. A student was investigating the hydrolysis of potato starch.

Fig. 1.3 shows the procedure used.

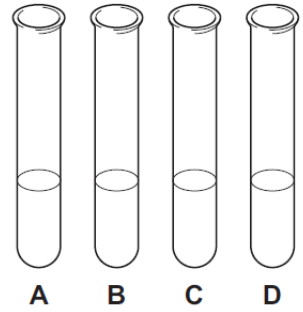
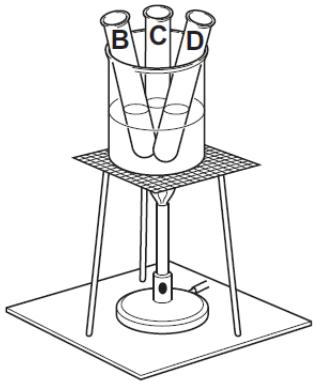
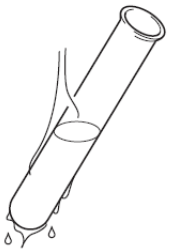
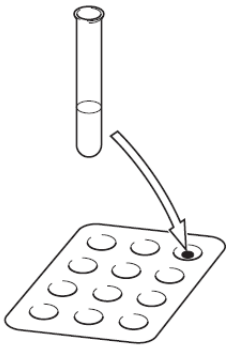
	Dilute hydrochloric acid was added to a sample of ground-up potato in each of four test tubes. These test tubes were labelled **A, B, C** and **D**.
	Test tubes **B, C** and **D** were placed into a boiling water bath. Test tube **A** moved directly to the next stage in the procedure.
	Sodium hydrogencarbonate was immediately added to test tube **A**. Test tube **B** was cooled at five minutes, **C** at ten minutes and **D** at fifteen minutes. Sodium hydrogencarbonate was added to each test tube.
	A small sample was removed from each test tube, and iodine solution was added.

Fig. 1.3

The results are shown in the table below.

Test tube	Time in boiling water (min)	Observation with iodine solution
A	0	dark blue/black
B	5	dark blue
C	10	dark brown
D	15	

(i) Suggest the expected observation for test tube **D** and give a reason for your answer.

[1]

(ii) Suggest why sodium hydrogencarbonate was added to all four test tubes.

[1]

(iii) The student proposed that:

Dilute hydrochloric acid played a significant part in the hydrolysis of potato starch.

Describe a suitable control that the student could have carried out to test this hypothesis.

[2]

(iv) The students found it difficult to compare each other's observations on the colour changes.

What method could they have used to obtain quantitative results?

[1]

Total Marks for Question Set 13: 10