



CHEMISTRY • CLASS 12

CHAPTER 10

Biomolecules

NCERT SOLUTIONS

MONOSACCHARIDES AND REDUCING SUGARS

10.1 What are monosaccharides?

Monosaccharides are the simplest carbohydrates. They cannot be hydrolysed into simpler carbohydrates. In open-chain form, they are polyhydroxy aldehydes or ketones.

Glucose — $C_6H_{12}O_6$

10.2 What are reducing sugars?

A reducing sugar has a free anomeric carbon. Its ring can open to a carbonyl form and it reduces Fehling's or Tollens' reagent. Glucose, maltose and lactose are reducing sugars. Sucrose is non-reducing because its two anomeric carbons are tied up in the glycosidic bond. Fructose can also reduce these alkaline reagents after tautomerisation.

TWO FUNCTIONS OF CARBOHYDRATES IN PLANTS

Exercise 10.3

Q. Write two main functions of carbohydrates in plants.

1. STORAGE:

Glucose made by photosynthesis is converted into starch, a plant storage polysaccharide. Starch can be broken down when energy is required.

glucose $\longrightarrow$ starch (stored food)

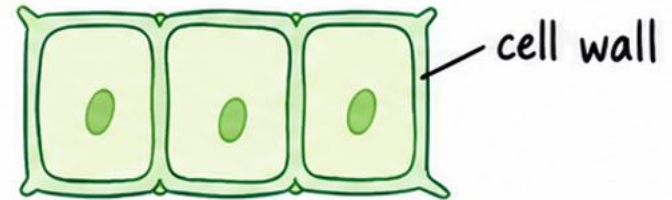


leaf (stores starch)

2. STRUCTURE:

Cellulose forms the cell wall of plants, giving strength, shape and support.

glucose units $\longrightarrow$ cellulose (cell wall)



plant cells (cellulose)

CLASSIFY THE SIX SUGARS

Exercise 10.4

Classify ribose, 2-deoxyribose, maltose, galactose, fructose and lactose into monosaccharides and disaccharides.

Solution:

MONOSACCHARIDES (single sugar unit)	DISACCHARIDES (two sugar units)
ribose 2-deoxyribose galactose fructose	maltose lactose

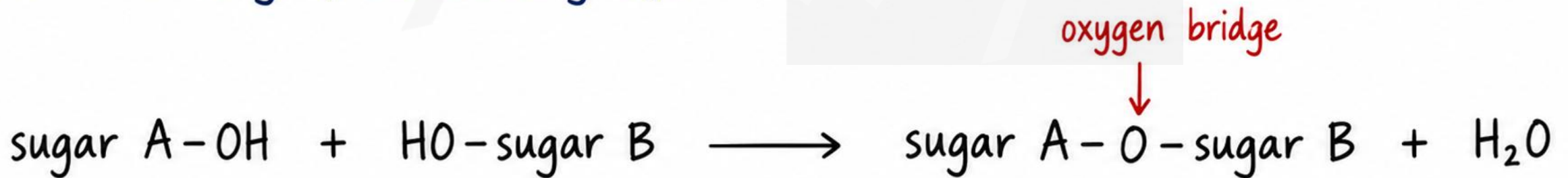
Monosaccharides cannot be hydrolysed to smaller carbohydrates. Disaccharides hydrolyse to two monosaccharides.

GLYCOSIDIC LINKAGE

10.5 What do you understand by the term glycosidic linkage?

Solution:

A glycosidic linkage is a C-O-C oxygen bridge joining two monosaccharide units. It forms when the anomeric -OH of one sugar reacts with an -OH of another sugar, eliminating H₂O.



In maltose, two D-glucose units are joined by an $\alpha(1 \rightarrow 4)$ glycosidic linkage.



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