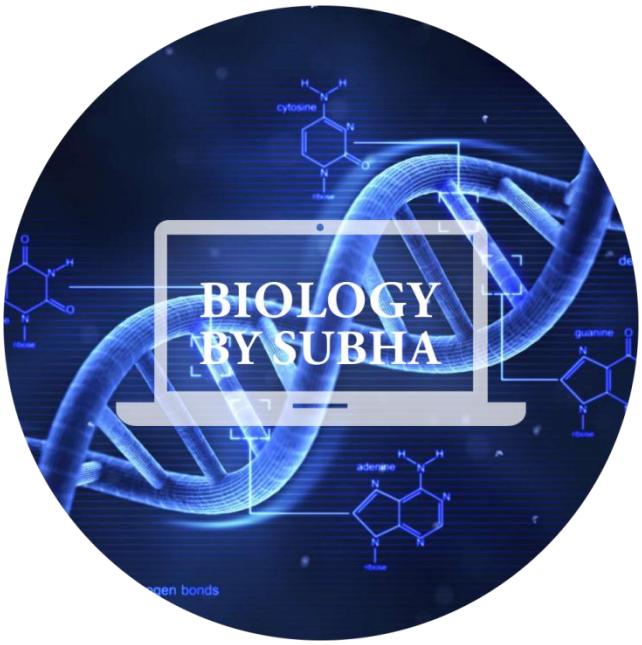


BIOMOLECULES

Topic-1: Carbohydrate (Part-1)

Carbohydrates.

→ **Old deffinition:** Carbohydrates are hydrates of carbon.

$$C_n(H_2O)_n$$

then, $n : n$

$= 1 : 1$.

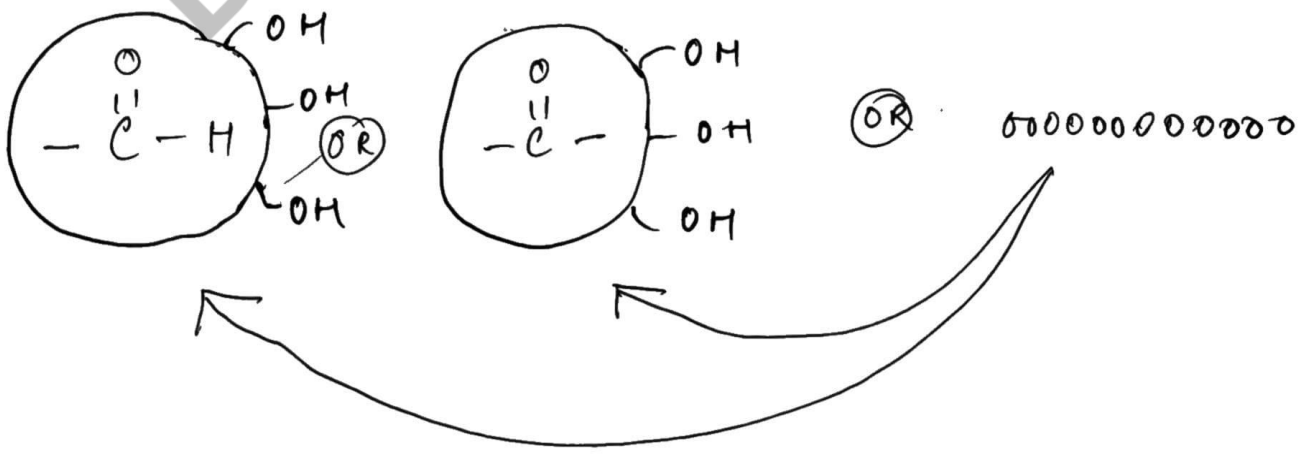
But,

CH_3COOH $\quad$ $HCHO$ $\quad$ $C_5H_{10}O_4$

$= C_2(H_2O)_2$ $\quad$ $= C(H_2O)$ $\quad$ Deoxydribose

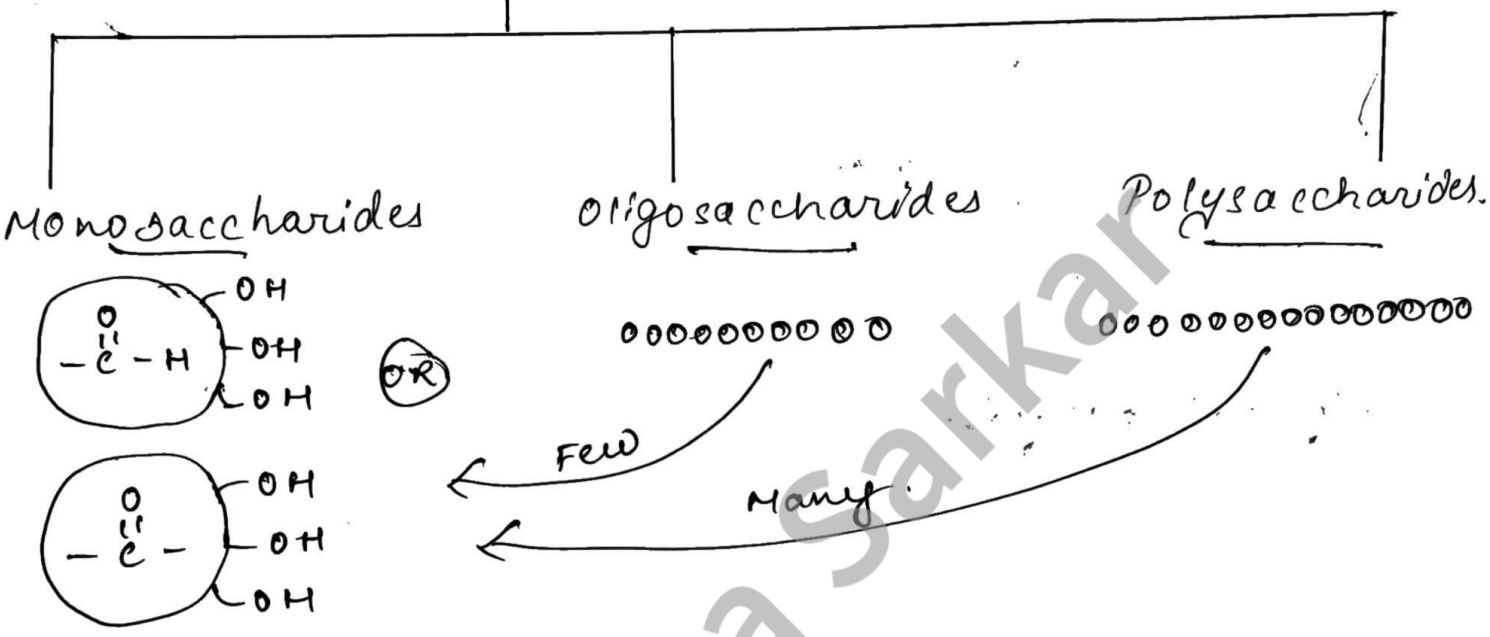
$= 2 : 2 = 1 : 1$ $\quad$ $= 1 : 1$

→ **New deffinition:** Carbohydrates are polyhydroxy aldehydes or polyhydroxy ketones or the compounds that produce them upon hydrolysis.



Classification.

Carbohydrates.



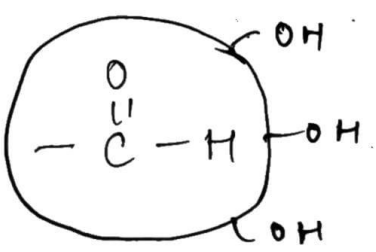
i) Monosaccharides

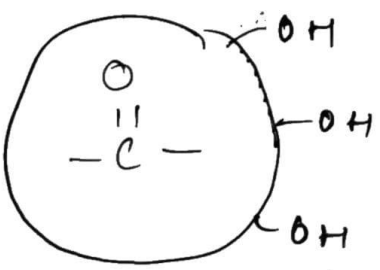
→ Simplest carbohydrates, hence can't be further hydrolysed into more simple form.

→ Usually follow the formula,

$$C_n(H_2O)_n$$

where, $n = 3-7$.





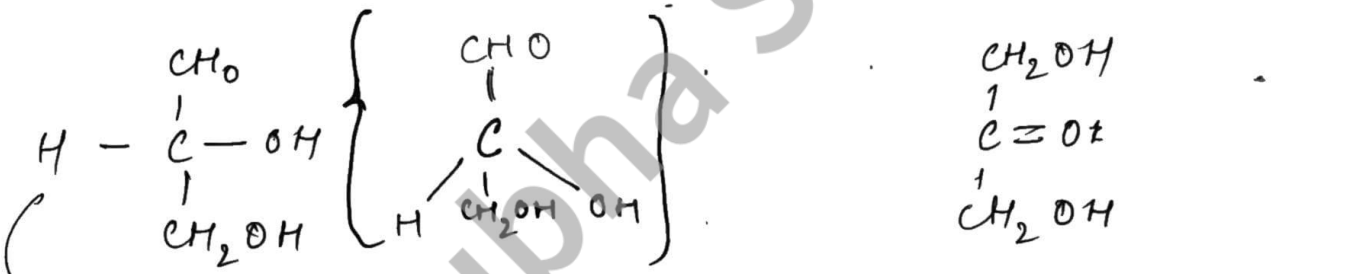
Classification:

On the basis of functional groups

CLASSES	Aldoses (CHO)	Ketoses (CO)
Trioses (3C)	Glycerol dehyde	Dihydroxy acetone
Tetroses (4C)	Erythrose	Erythrulose
Pentoses (5C)	Ribose	Ribulose
Hexoses (6C)	Glucose, Mannose, Galactose	Fructose
Heptoses (7C)	Glucoheptose	Seduheptose

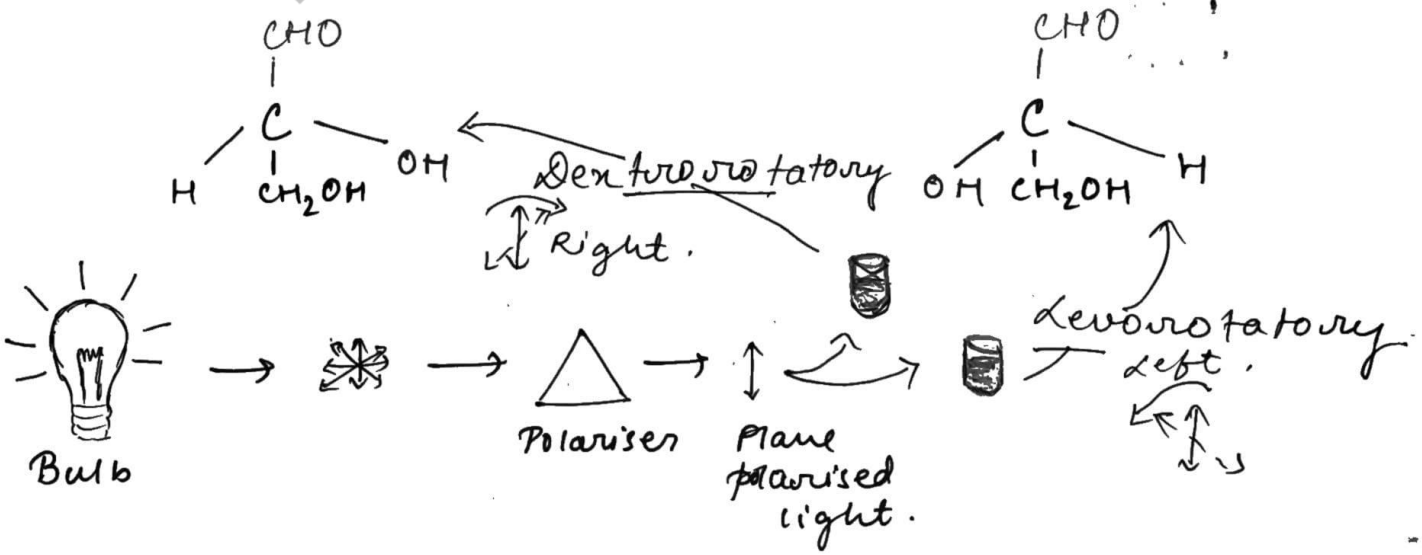
Isomerism in monosaccharides.

Glyceral dehyde — Dihydroxy acetone

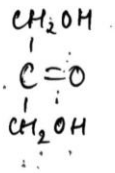


→ simplest optically active monosaccharides.

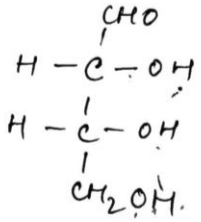
Glyceral dehyde.



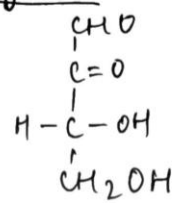
Dihydroxy acetone



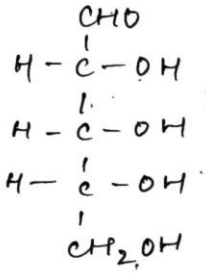
Erythrose.



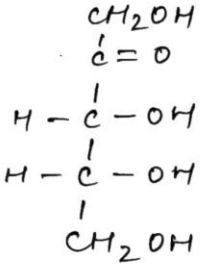
Erythulose.



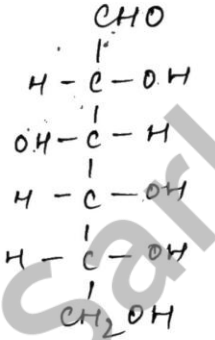
Ribose.



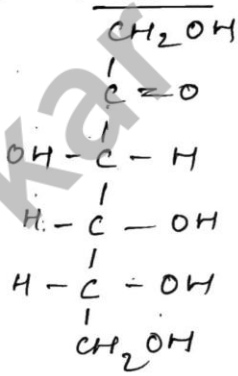
Ribulose.



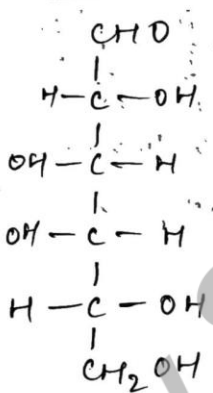
Glucose.



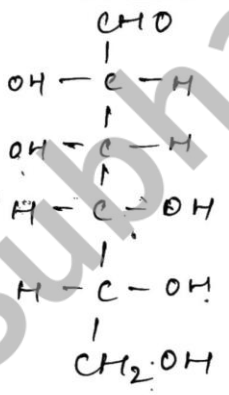
Fructose



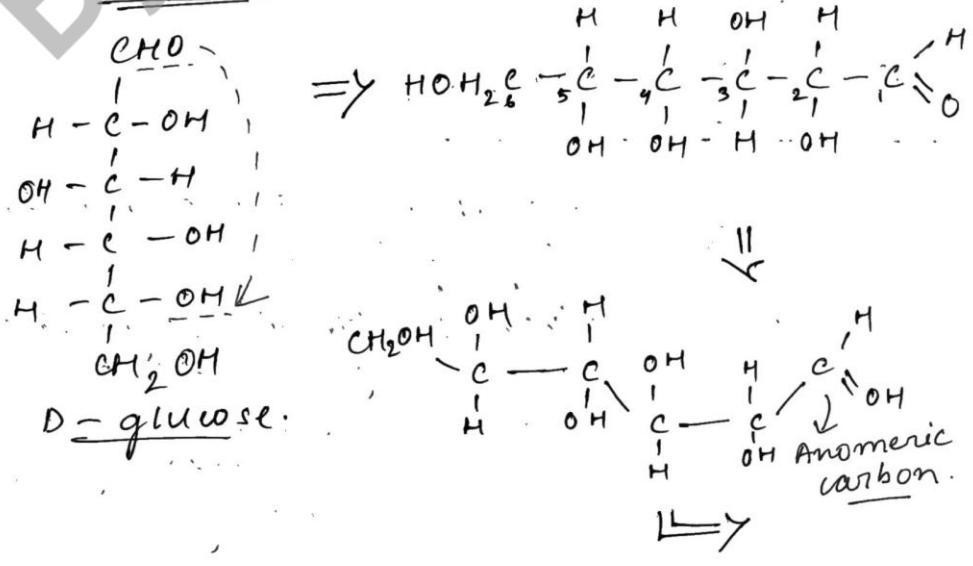
Galactose.



Mannose.

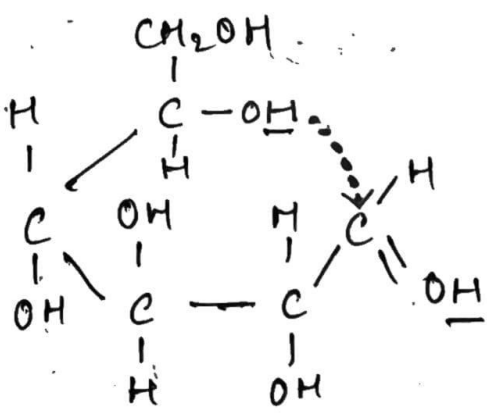


Anomeric carbon.

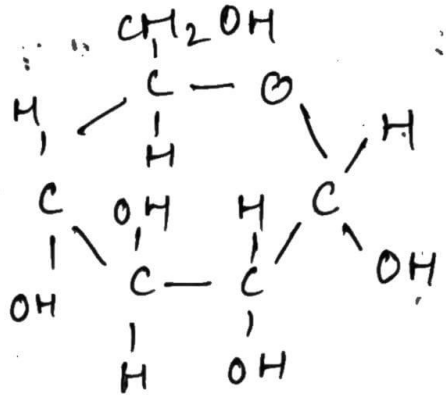


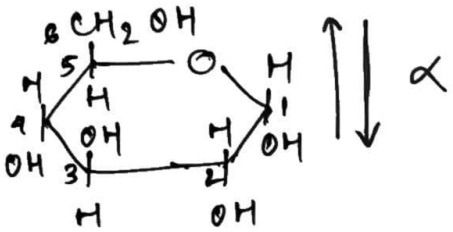
D-glucose.

Anomeric carbon.



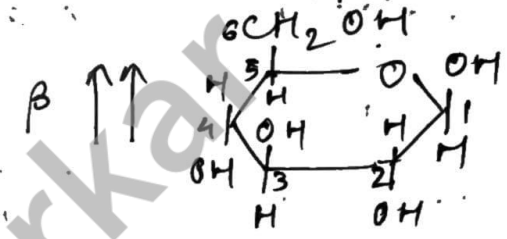
⇒





α

α-D Glucose
(α-D Glucopyranose)



β-D Glucose.
(β-D Glucopyranose)

*Note:-

i)  → Pyran

ii)  → Furan.

⇒ Hexoses:- Most abundant monosaccharide in living system.

Example. i) Glucose:- Grape sugar, blood sugar & Dextrose.

ii) Fructose:- Fruit sugar, Levulose, sweetest sugar & honey.