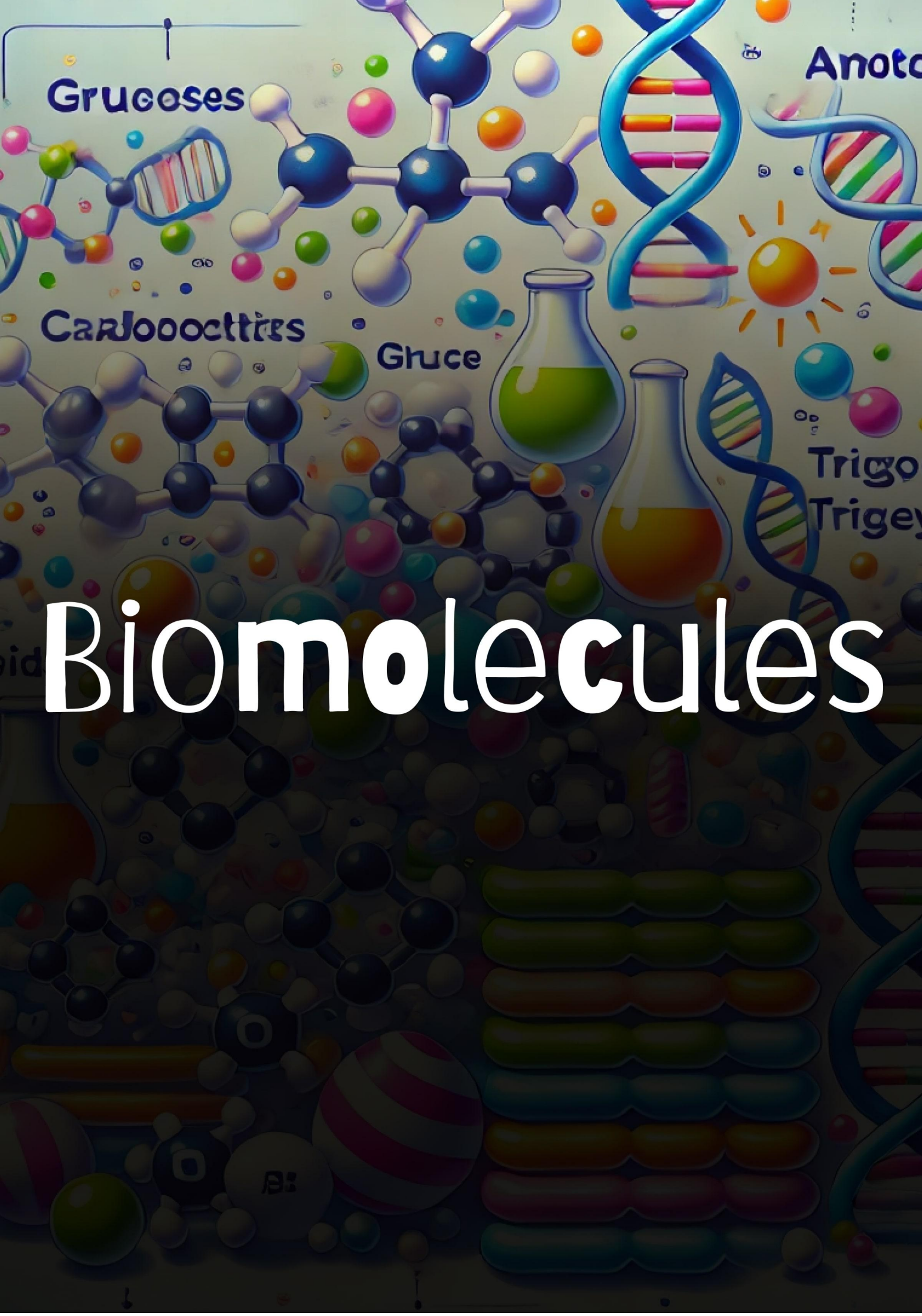


Classification of Monosaccharide

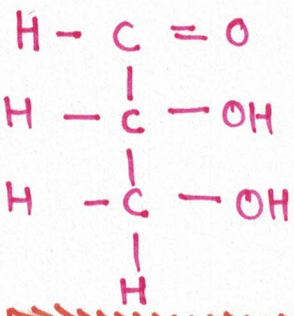
on the basis of functional group.

Aldose $-\overset{\overset{O}{\|}}{C}-H$, Ketose $>C=O$

1st carbon — 2nd carbon

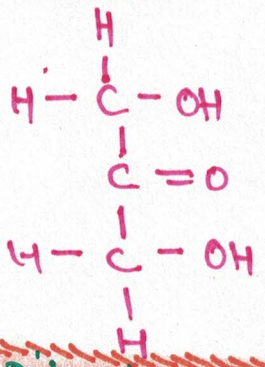
Trioses (3C)

Aldose



Glyceraldehyde

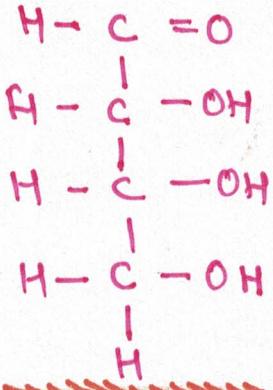
Ketose



Dihydroxyacetone

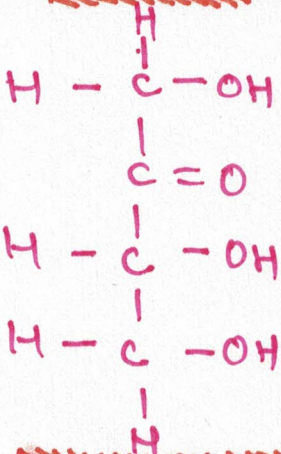
Tetroses → 4C

Aldose



Erythrose

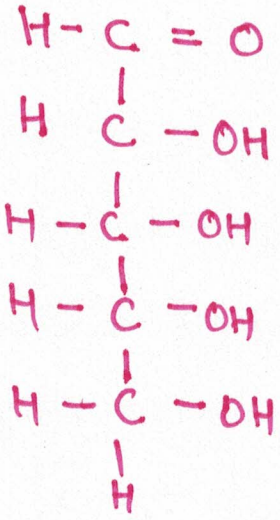
Ketose



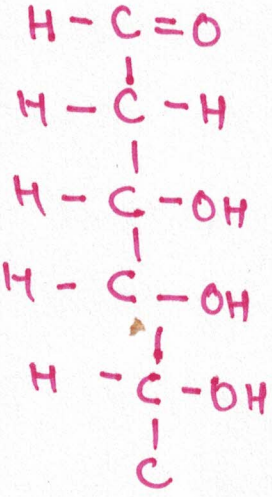
Erythrulose

Pentoses = 5C

Aldose

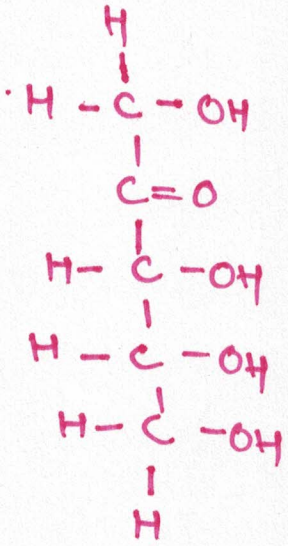


Ribose



Deoxyribose

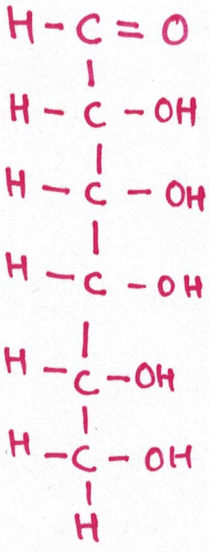
Ketose



Ribulose

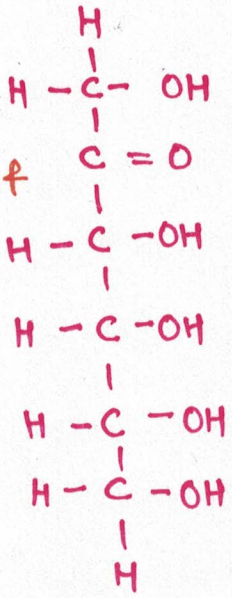
Hexoses ⇒ 6 C

Aldose



Allose
Glucose & Epimers

Ketose



Psicose
Fructose & Epimers

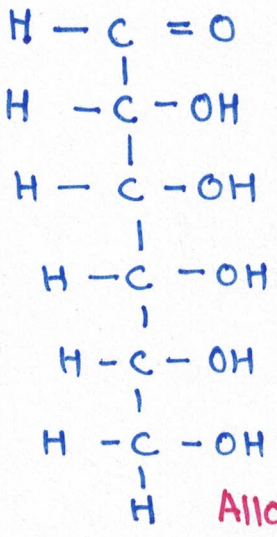
Note:- "ul" suffix is added with ketose sugar of 4, 5, 7 carbon.

EPIMER

Isomers which is obtained by interchange of H and OH in Hexose sugar at 2nd, 3rd and 4th carbon are known as Epimer.

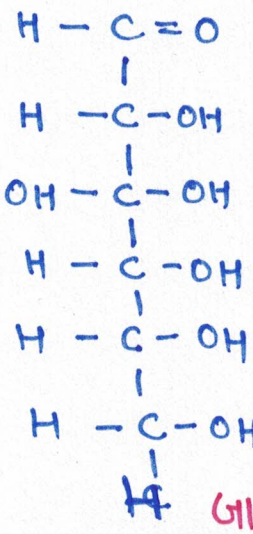
→ Epimer are present in both linear and cycle structure.

Hexose → Aldose



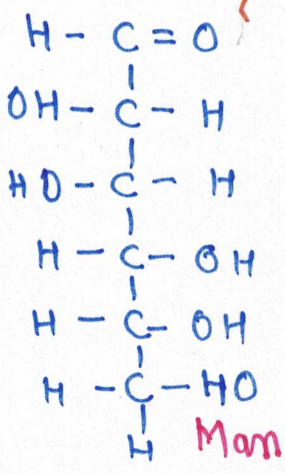
Allose

3rd carbon Epimer of Glucose.



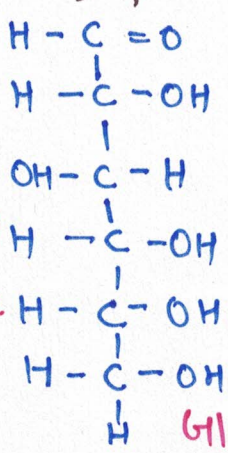
Glucose

EPIMER OF GLUCOSE



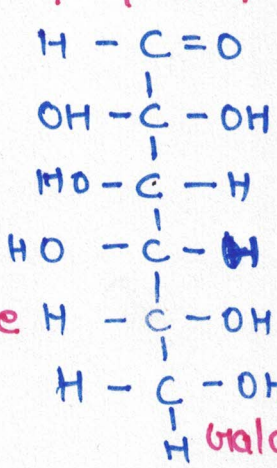
Mannose

2nd C Epimer → Mannose



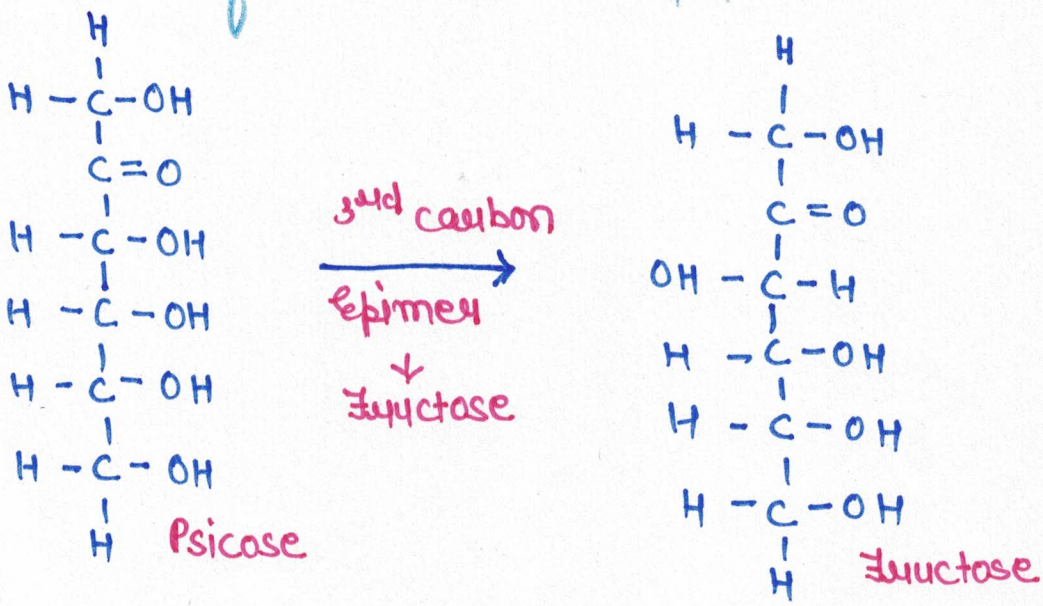
Glucose

4th C Epimer → Galactose



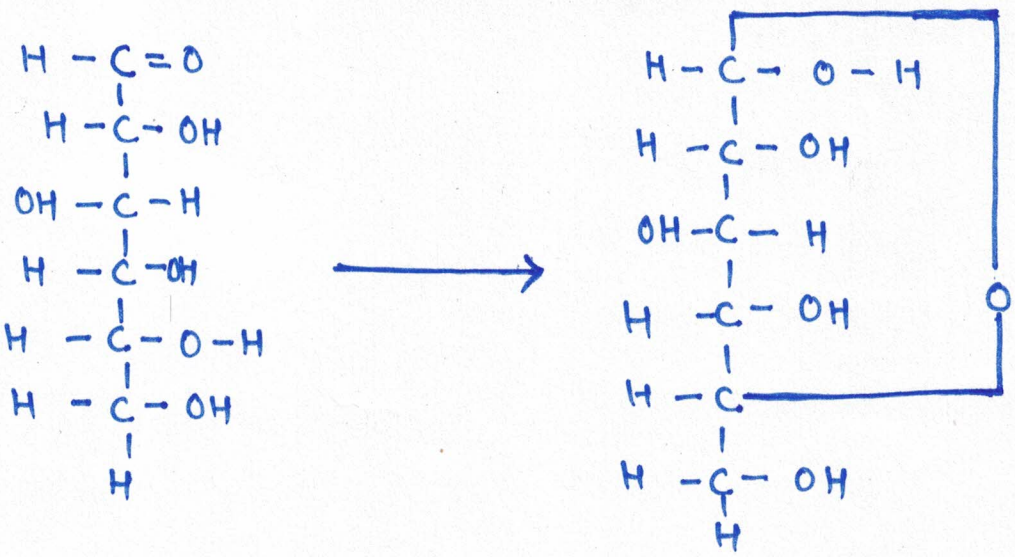
Galactose

Epimer of Hexose → ketose

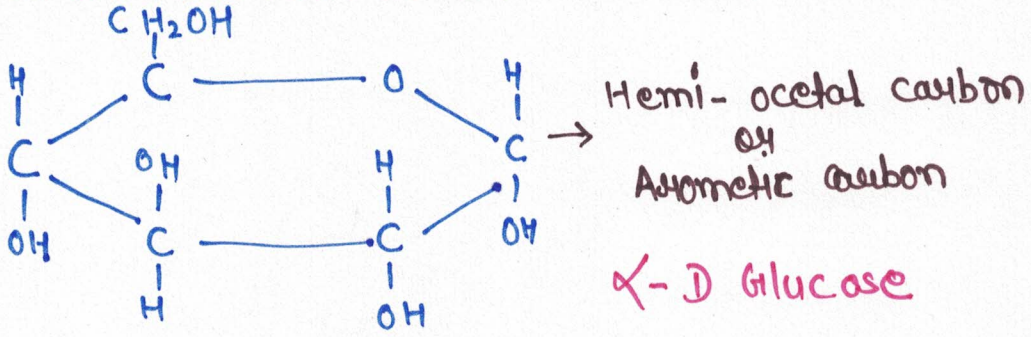


ANOMER HEXOSE GLUCOSE

Anomer : Hexose → Glucose



PYRANOSE RING [5C + 1, O]



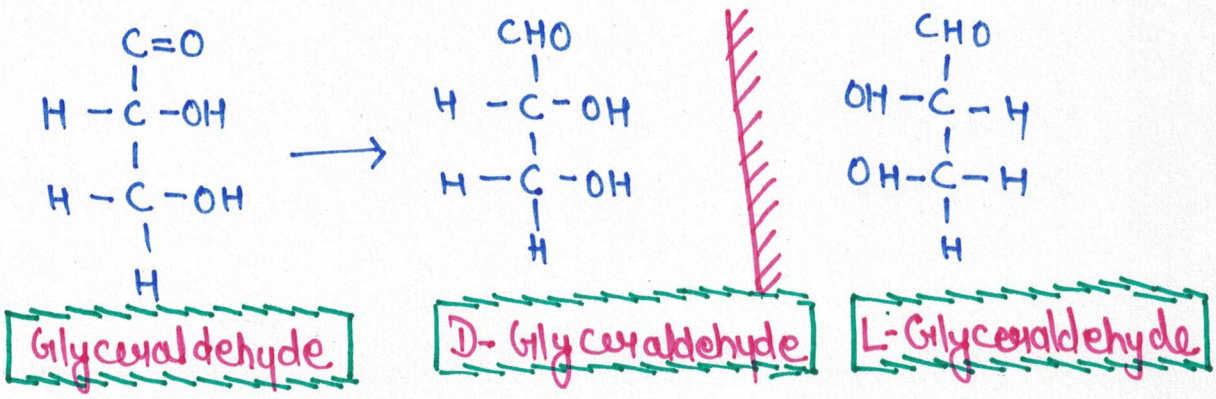
→ Anomers are present in cyclic structure.

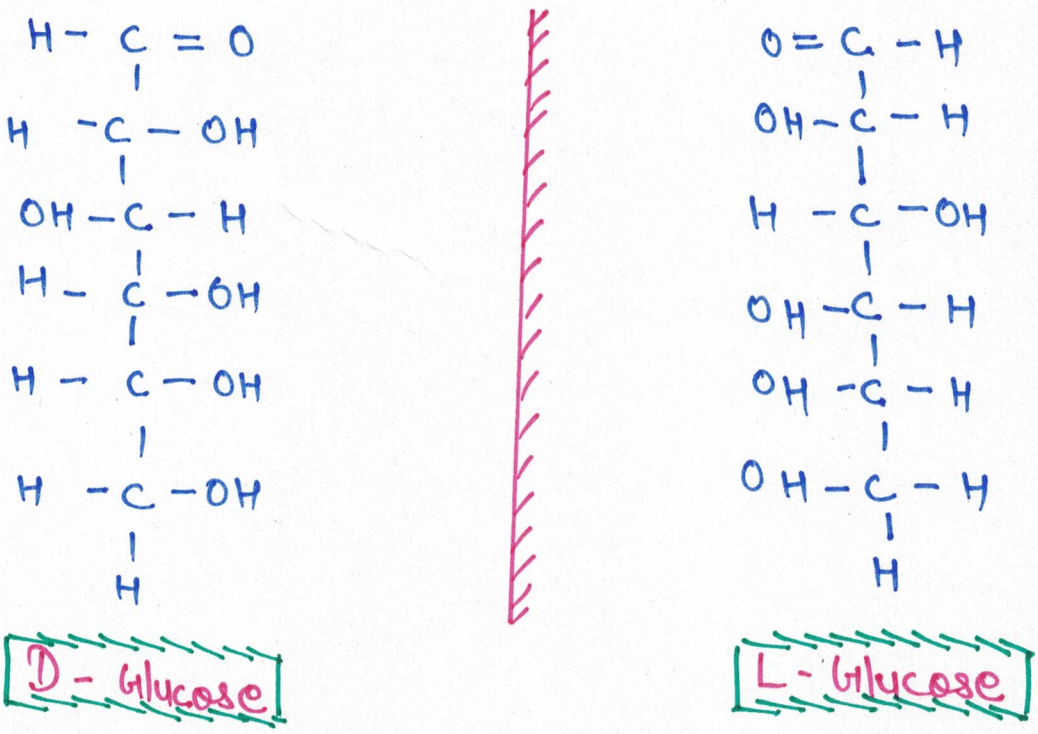
→ Interchange of H and OH at hemiacetal C or hemicetal 'C' or anomeric carbon.

'D' and 'L' ⇒

→ These represent absolute configuration of atom or group in an organic compound.

→ D and L form can be decided by the presence of heavy atomic no. group or atom on either right hand side or left hand side at second last carbon.





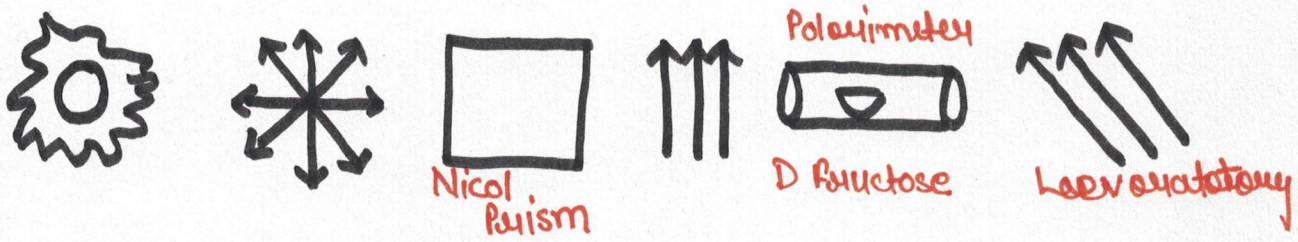
* No. of chiral carbon in aldose sugar ⇒
[No. of C in aldose sugar - 2]

* No. of chiral carbon in ketose sugar ⇒
[No. of C in ketose sugar - 3]

* No. of chiral carbon is increased by one unit in cyclic structure of monosaccharide from their linear structure.

d and l form

Dextrorotatory, d(+) | Laevorotatory, d. (-)



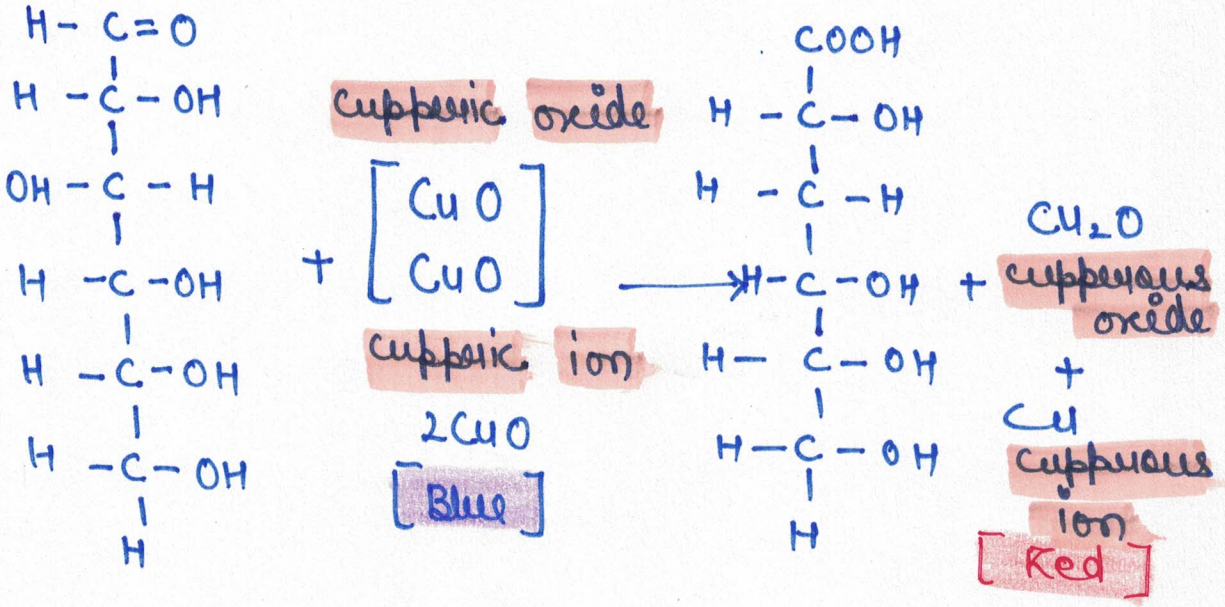
* Glucose is present in both 'd' and 'l' form but mainly in 'd'.

* Fructose is always (+) nt in 'l' form.

Reducing Character

→ Carbohydrate which contain free CHO group, free CO group, free hemiacetal group carbon, free hemiacetal carbon shows reducing character.

→ Solution used to detect glucose in urine.



Oligosaccharide

→ Monosaccharides are linked by 1→4 Oglycosidic linkage.

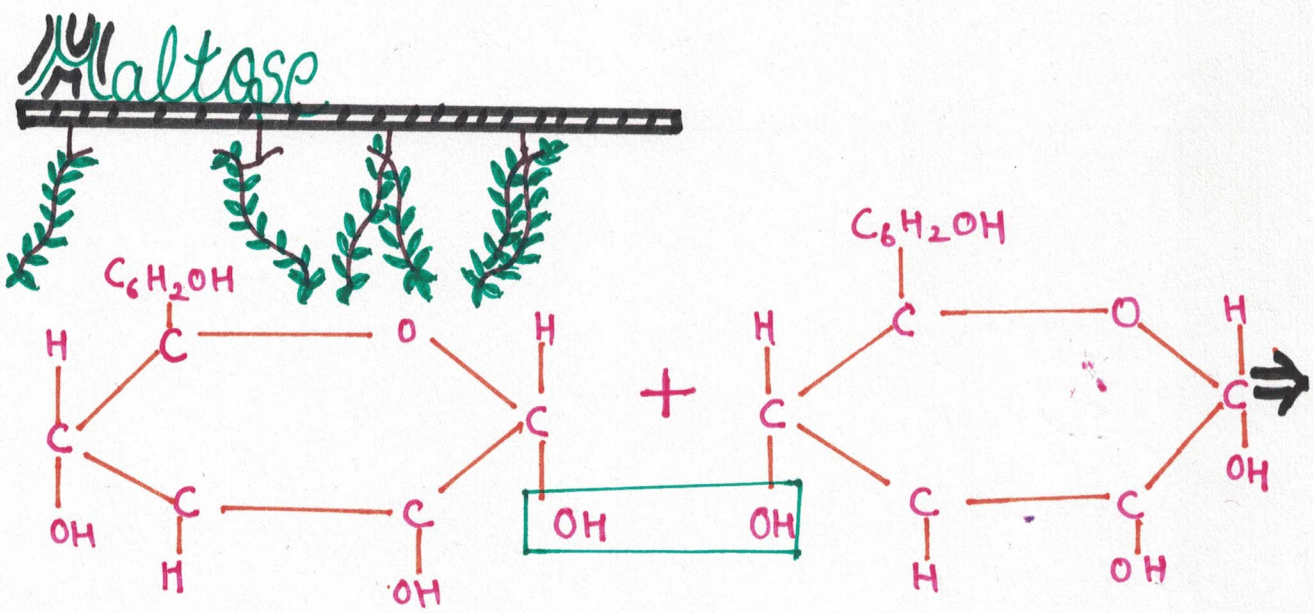
→ If fructose is present then linkage is 1→2 Oglycosidic linkage

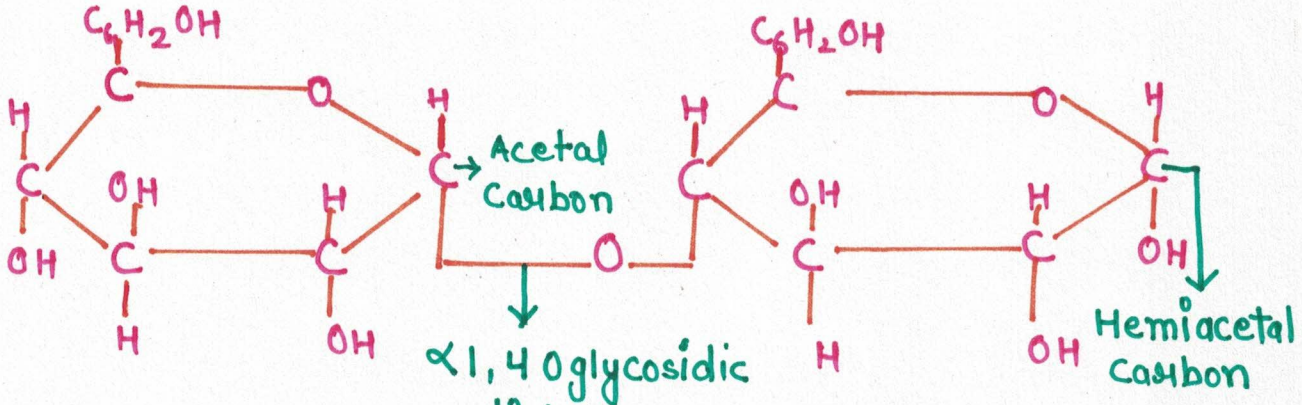
→ Disaccharide : 2 units of monosaccharide.

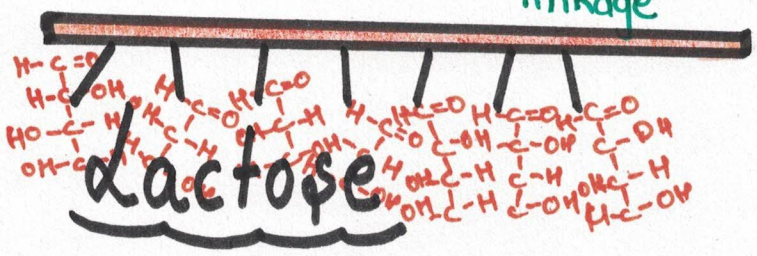
Mala Su Tose] NON Reducing

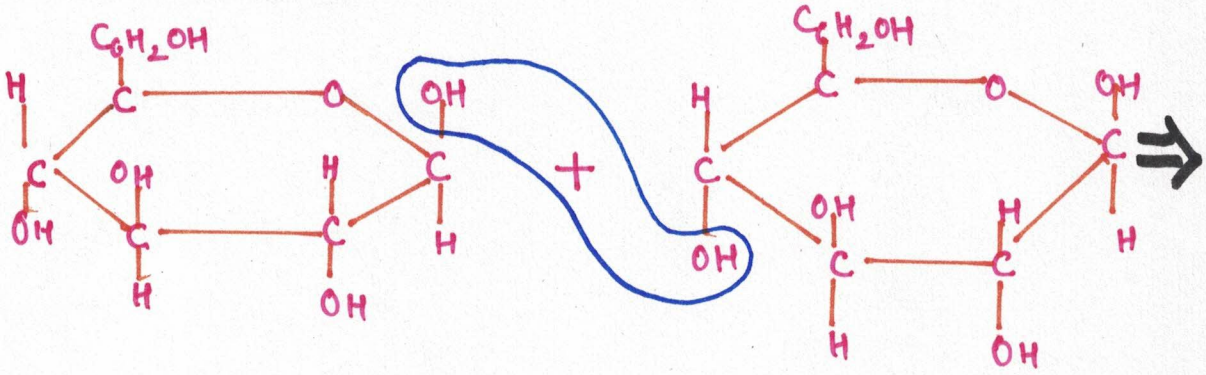
Reducing

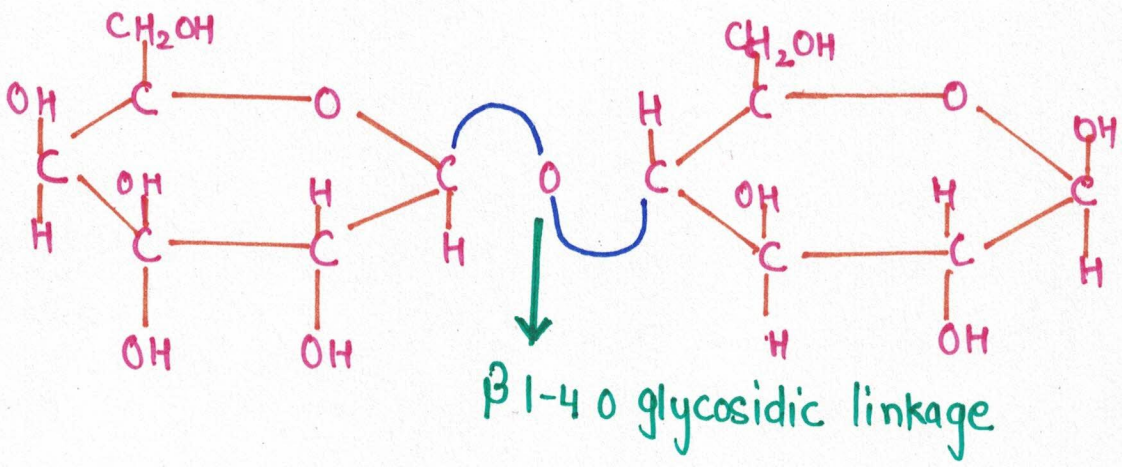
Maltose, Lactose, Sucrose, Trehalose











POLYSACCHERIDE

Glycans

- Suffix 'an' is used in their naming.

  Hexose → Hexan
  Mannose → Mannan

  Monosaccheride Polysaccheride
  Pentose → Pentasan
  Arabinose → Araban

- Polysaccherides are non-reducing in nature but in their structure R.H.S is reducing while L.H.S is non-reducing.
- Polysaccherides are less soluble in water & tasteless.

CLASSIFICATION OF POLYSACCHERIDE ON THE BASIS OF STRUCTURE

1 HOMOPOLY SACCHERIDE

Same unit of monosaccheride.

2 HETEROPOLYSACCHERIDE

Different unit.

Trick to Learn :→ हारा अकेला हेमा पे हैं कौन फिदा
Heteropolysaccheride Hy alu Hema Pe - He - chamonic acid cellulose - chin pavin - driotin.

Trick to Learn :→ गली की स्टार सेंटी
Homopolysaccheride Gly chi star - cell Inulin - cogen tin - ch lulose.

Homopolysaccharide

1. STARCH

Stored food in plants.

Maximum starch ⇒ Potato

Amylose :→ 200-300 unit of α-D Glucose [Linear chain], α 1-4 O-glycosidic linkage.

- While performing Iodine test it gives blue colour.
- Due to its helical structure it can hold I_2 molecules in its helical position and on performing Iodine test it gives blue colour.

Amylopectin :→ 20-30 units of α-D Glucose form linear structure and α-1-4 O glycosidic linkage.

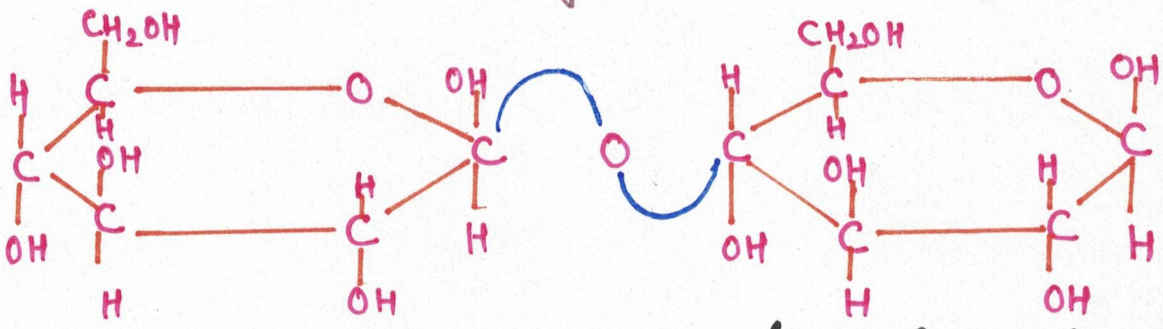
2. GLYCOGEN

- Animal Starch.
- Maximum storage Liver > Muscle.
- 8-12 unit of α-D glucose you linear structure and have α 1-4 O glycosidic linkage.
- After 8-12 unit branching start at branch point it shows α 1-6 O glycosidics linkage.

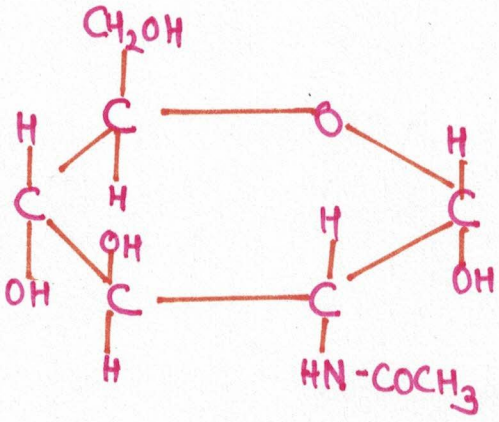
CELLULOSE

- Present in cell wall of plant.
- Paper is made up of pulp of wood which is cellulose.
- 90% cellulose is present in cotton and 50% in wood.
- β-D glucose → 6000 – 10,000 unit.

Cellulose $\xrightarrow[\text{Digestion}]{\text{incomplete}}$ Cellobiose



Cellobiase (Reducing nature)



NAG → N-acetetyl glucosamine