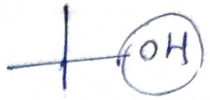
Sayantrita Panja, Sem-V, cc-12

Carbohydrate

General formula : $C_x(H_2O)_y$

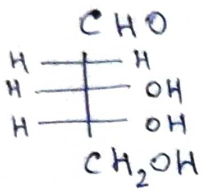
It is not hydrate of carbon.



D

× CH_3COOH $C_2(H_2O)_2$.

× $HCHO$ $C(H_2O)$



Carbohydrate is polyhydroxy carbonyl compound having chiral centre i.e. optically active.

2-Deoxyribose. ✓

Carbohydrate

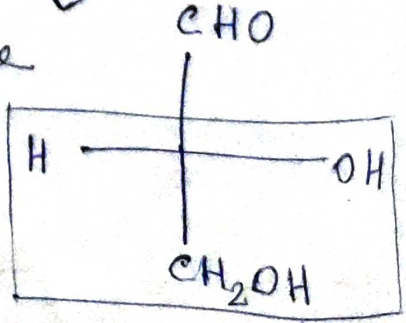
- Sugar
  - 1) Sweet
  - 2) Crystaline
  - 3) Water soluble.
  - monosacaride (1) — which are not hydrolysed.
  - oligosacaride (2-10) — After hydrolysis, gives more than monosaccharide unit.
- polysaccharide (>10)
  - 1) not sweet
  - 2) not crystaline
  - 3) insoluble in water

3 C	triose
4 C	tetrose
5 C	pentose
6 C	hexose.

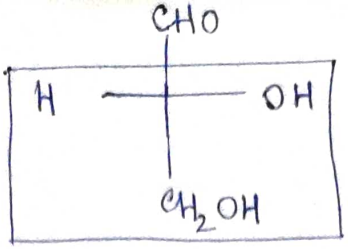
Aldose Ketose

Simplest carbohydrate : glycaraldehyde (aldo triose) ✓

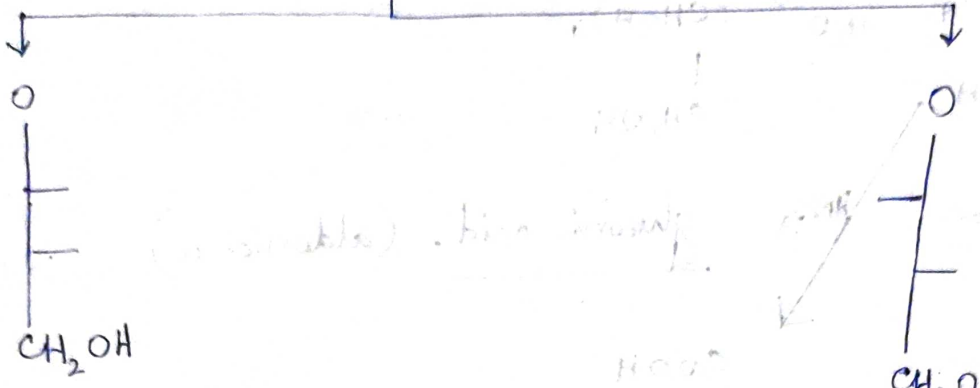
D/L



O ≡ CHO

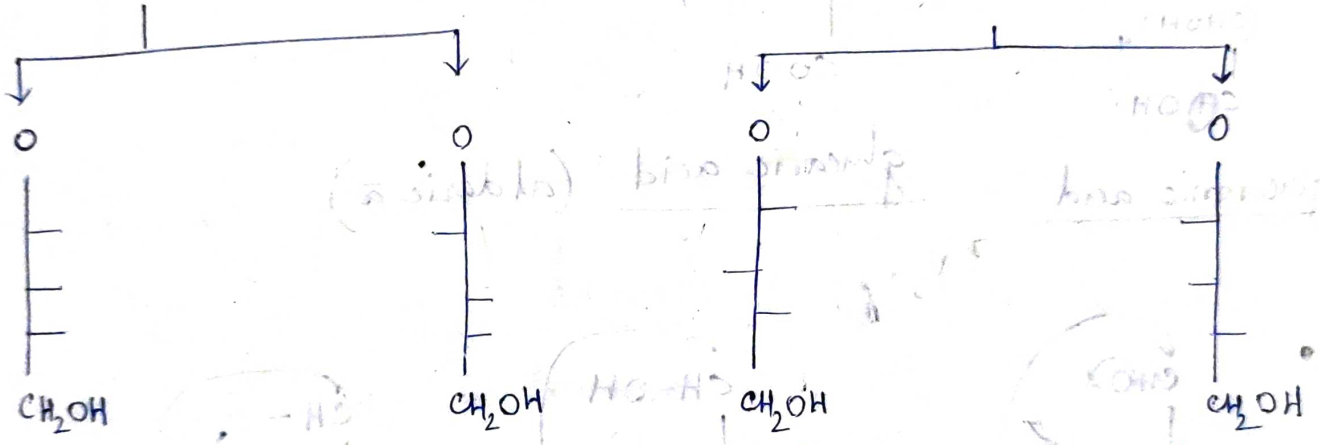


D-glycearaldehyde.



Erythrose

Threose.

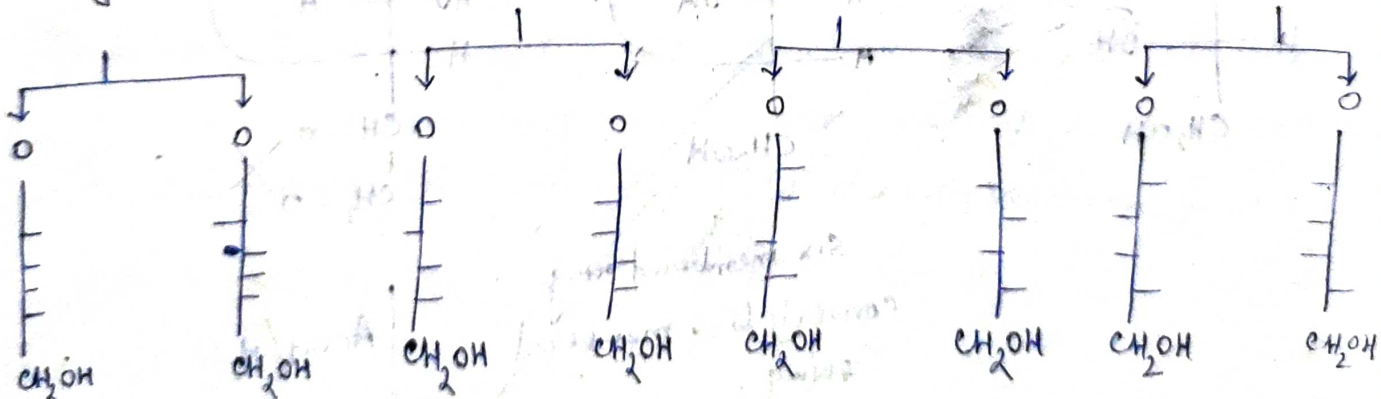


Ribose (ring)

arabinose (all)

xylose (xylophone)

lyxose. (loudly)



allose (all)

altrose (altruist)

glucose (gladly)

mannose (make)

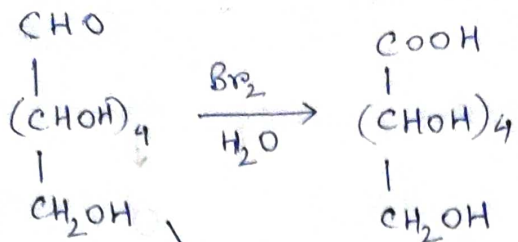
gulose (gum)

iodose (in)

galactose (gallon)

talose (tank)

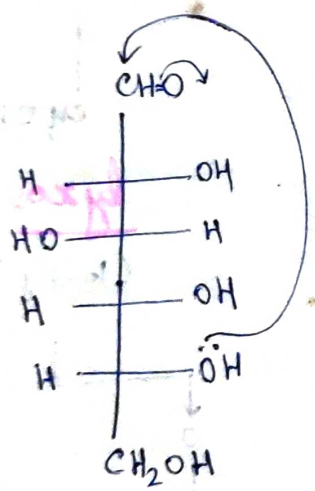
Oxidation :

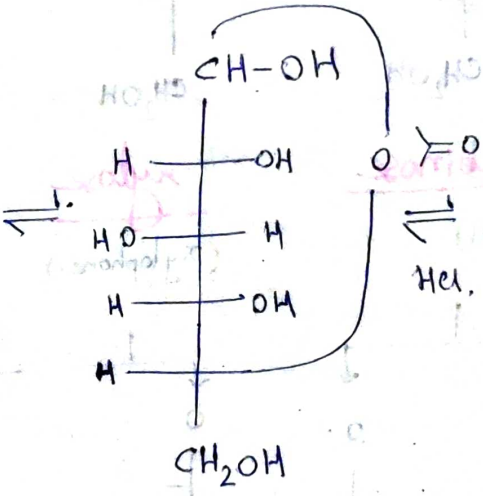


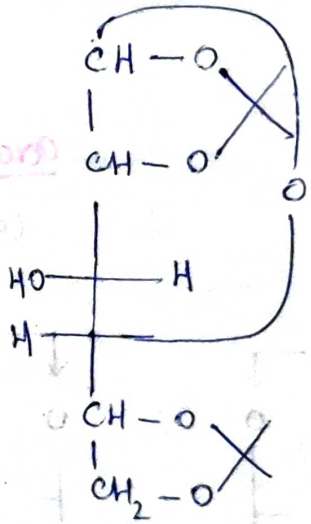
glucose $\xrightarrow{HNO_3}$ gluconic acid. (aldonic ā)

glucose $\xrightarrow{?}$ glucuronic acid

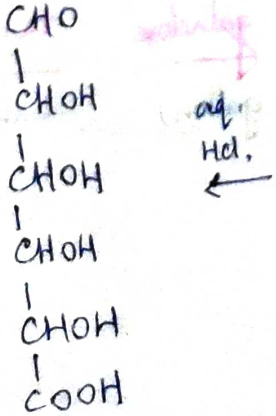
gluconic acid $\xrightarrow{?}$ glucaric acid (aldaric ā)



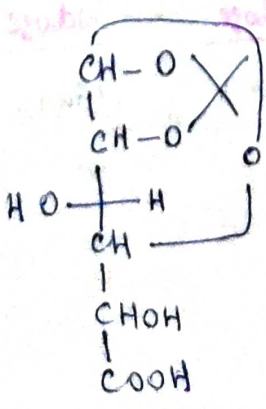




Six membered ring converts to 5 membered ring.

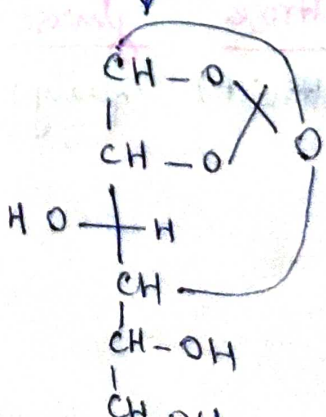


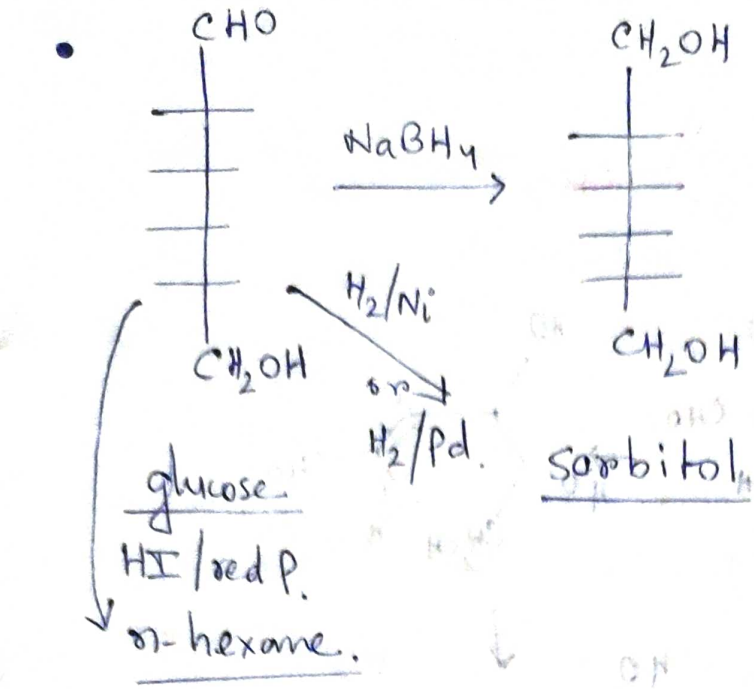
aq. Hcl.

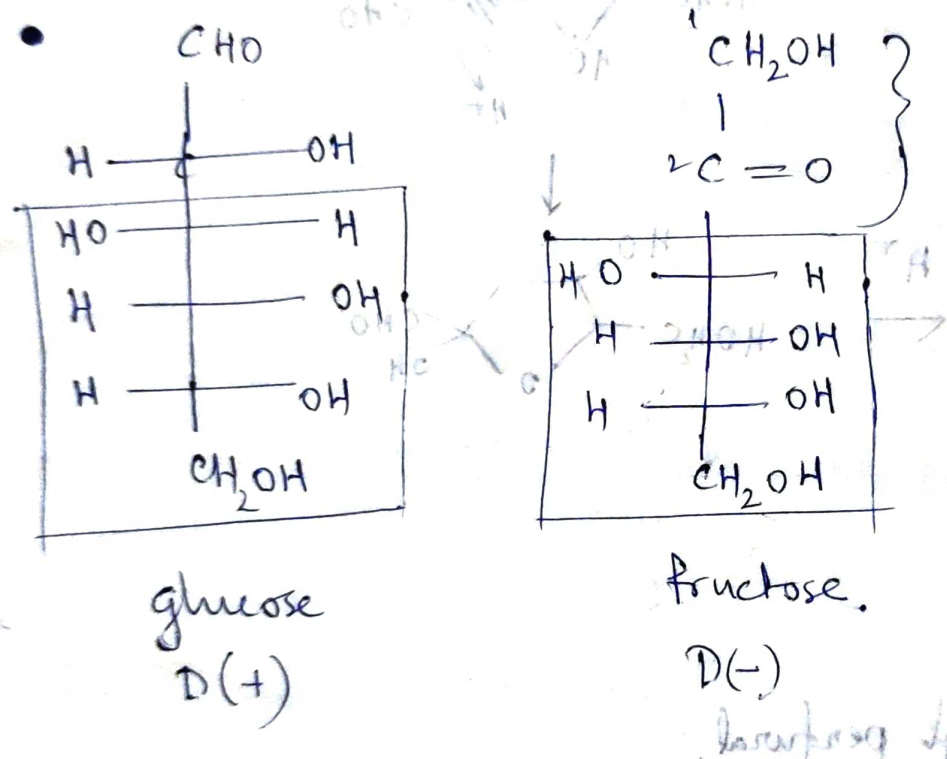


Pd-C
[O]
only 1° ale.

AcOH/H2O



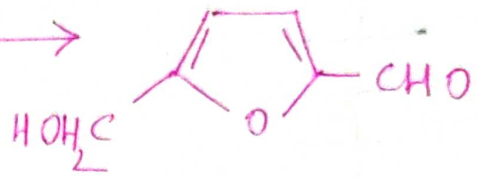


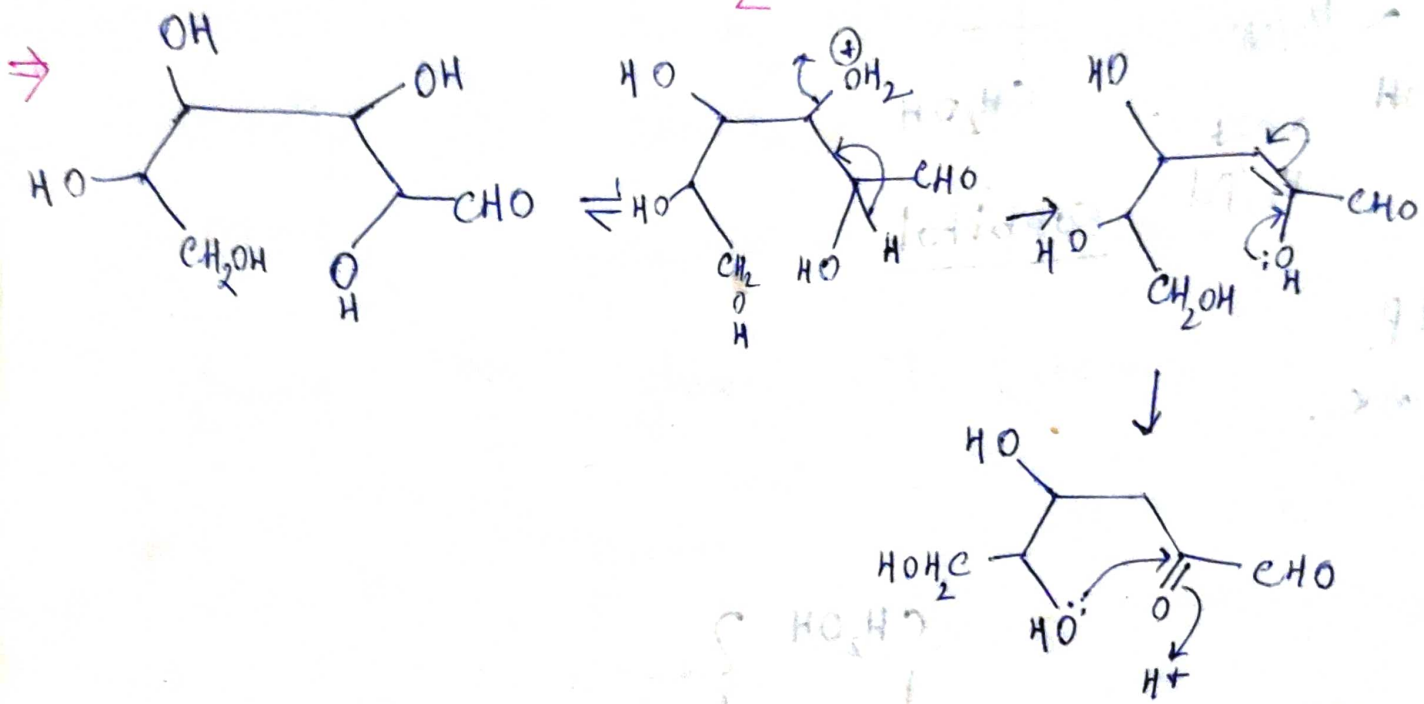


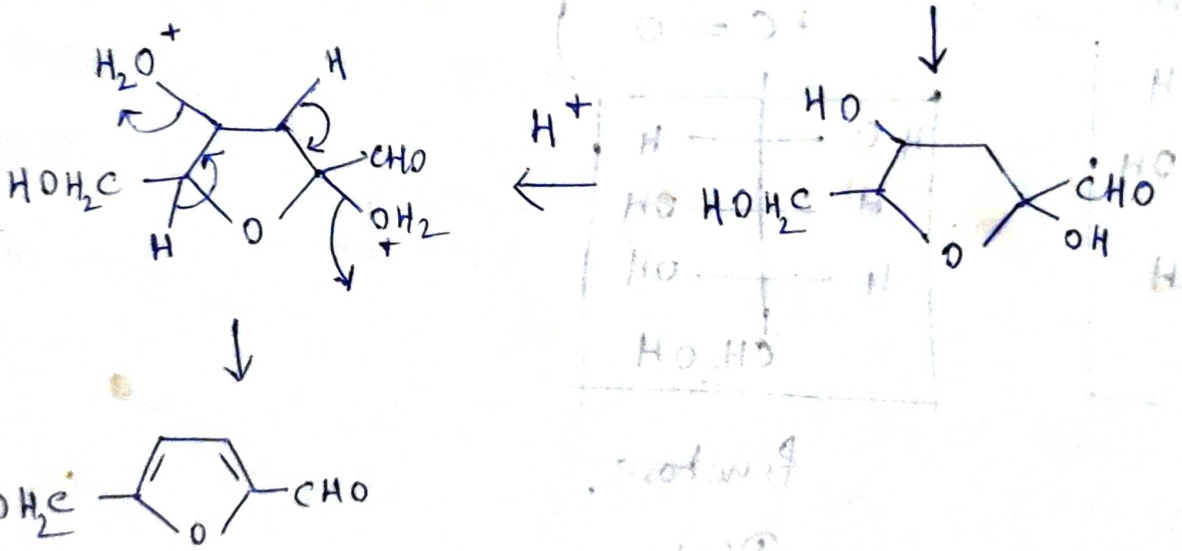
glucose
D(+)

fructose.
D(-)

Both are reducing sugar. Glucose has -CHO gr. So it reduces Tolen's reagent. In presence of alkali, fructose undergoes a rearrangement (Lobry de-Bruyn Van Ekenstein rearrangement) to produce D(+) mannose and D(+) glucose. They can reduce Tollen's reagent.

Q:) D-glucose $\xrightarrow{c.HCl}$ 





5-hydroxy methyl perfural.