

SUBJECT - CHEMISTRY

CLASS - B.Sc (Hons) PART - II

PAPER - IV

TOPIC - CARBOHYDRATES

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Q. What are Carbohydrates?

Ans. The term Carbohydrate means the hydrate of Carbon $C_n(H_2O)_m$ where m and n are equal or greater than four e.g. glucose $C_6(H_2O)_6 \equiv$ $C_6H_{12}O_6$ fructose $C_6(H_2O)_6 \equiv C_6H_{12}O_6$ sucrose $C_{12}(H_2O)_{11} \equiv C_{12}H_{22}O_{11}$ raffinose $C_{18}(H_2O)_{16} \equiv C_{18}H_{32}O_{16}$ etc. Methanol (CH_2O), ethanoicacid ($C_2H_4O_2$) etc. have the general formula of Carbohydrates but do not show any resemblance with Carbohydrates. Further,Compounds like xanthose ($C_6H_{12}O_5$) which do not have the

above general formula of Carbohydrates are certainly

Carbohydrates. Hence, Carbohydrates are optically active

polyhydroxy aldehydes and ketones and compounds convertible

into these aldehydes and ketones by hydrolysis. Their

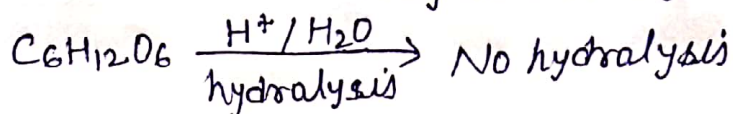
names generally end in -ose e.g. glucose, sucrose etc.

Carbohydrates are also called as Saccharides.

Q. How are Carbohydrates classified?

Ans. Carbohydrates are at best classified on the basis of their hydrolysis into following classes:

(1) Monosaccharides: They do not hydrolyse e.g.



They may be aldoses or ketoses depending upon whether

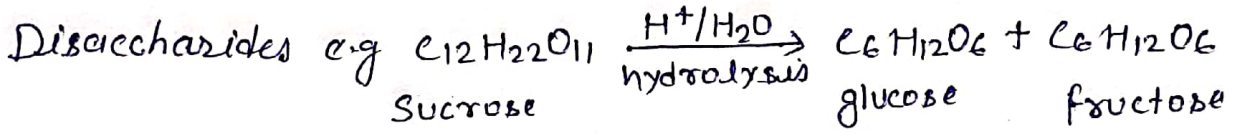
they have an aldehyde or a keto-group free or potential.

They can be further subdivided into trioses, tetroses, pentoses and hexoses depending on the number of C-atoms which they have e.g.

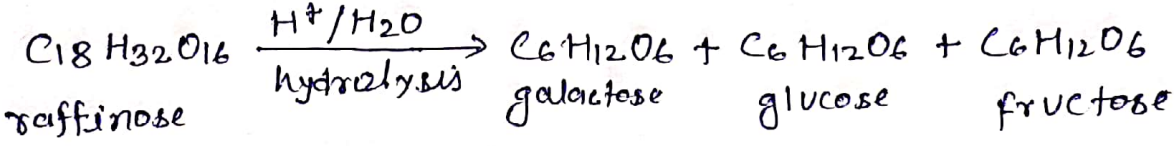
Aldohexose e.g glucose : $CHO \cdot (CHOH)_4 \cdot CH_2OH$

Ketohexose e.g fructose : $CH_2OH \cdot CO \cdot (CHOH)_3 \cdot CH_2OH$

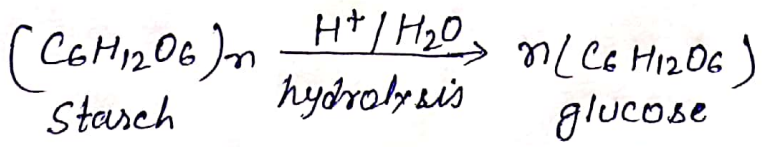
(2) Oligosaccharides : They can be hydrolysed into a few (2 to 10) monosaccharide units. They be di, tri, tetra- Saccharides depending upon the number of monosaccharide units which are formed on hydrolysis e.g



Trisaccharides e.g.



(3) Polysaccharides : They can be hydrolysed into hundreds or monosaccharide units e.g



They are also further subdivided into homo and heteropolysaccharides depending upon whether they give only one type or more than one type of monosaccharide units on hydrolysis.

Homosaccharides : Starch, cellulose etc.

Heterosaccharides : Inulin.

(4) Glycosides : Upon hydrolysis, they give a non-carbohydrate unit (aglycone) besides the carbohydrate fragment (glycone)

e.g.

