

What was the motivation behind setting out on an expedition for the three adventurous men?

Paper-II, B. (Zool Sub)

Date 24/01/22 CARBOHYDRATE (B.Sc - Part-II)

Q) Describe the structure, function and classification of Carbohydrate?

Ans (i) Carbohydrate is an important complex organic compound of living.

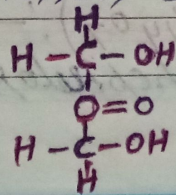
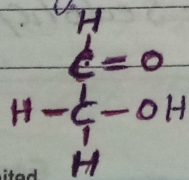
(ii) it is made by C, H, & O in which the ratio of H and O is 2:1. In some carbohydrates nitrogen and sulphur are also present.

(iii) The basis of chemical analysis of Carbohydrate we found that in all Carbohydrate hydroxyl group (-OH) are present with either aldehyde group (-CHO) or ketone group (C=O).

(iv) The Carbohydrate with aldehyde group are called aldoses (eg- hydroxy-acetaldehyde, glyceraldehyde, xylose, ribose, glucose, galactose etc). and

(v) The Carbohydrate with ketone group are called ketoses (e.g- dehydroxy-acetone, erythrulose, ribulose, xylulose, fructose, sedoheptulose etc).

Dehydroxy
acetaldehyde



Dehydroxy
acetone.

CLASSIFICATION: —

(A) ON THE BASIS OF SOLUBILITY AND TASTE CARBOHYDRATES ARE OF TWO TYPES: —

(i) Sugar Carbohydrate: — These carbohydrates are easily soluble in water, sweet in taste and crystalline. eg: — glucose, fructose etc.

(ii) Non sugar Carbohydrates: — These carbohydrates are insoluble in water, tasteless and amorphous. eg: — cellulose, starch, chitin etc.

(B) ON THE BASIS OF PRESENCE OF SUGAR MOLECULES CARBOHYDRATES ARE OF FOLLOWING TYPES: —

<1> MONOSACCHARIDE

<2> OLIGOSACCHARIDE

<3> POLYSACCHARIDE

<1> MONOSACCHARIDE CARBOHYDRATES: — In these carbohydrates only one sugar molecule is present. These are the simplest carbohydrates which general formula is $C_n(H_2O)_m$ on the basis of presence of carbon atom monosaccharide carbohydrates are of following types: —

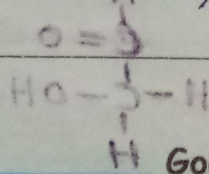
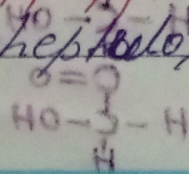
(i) Trioses ($C_3H_6O_3$): — eg: — Glyceraldehyde (Glycerine), dihydroxy ketone.

(ii) Tetroses ($C_4H_8O_4$): — eg: — Erythrose.

(iii) Pentose ($C_5H_{10}O_5$): — eg: — Ribose (it is found in RNA & DNA).

(iv) Hexose ($C_6H_{12}O_6$): — These are the most common carbohydrates which are found in fruits, animal's blood. eg: — glucose, galactose, fructose.

(v) Heptose ($C_7H_{14}O_7$): — eg: — Sedoheptulose, mannoheptulose.



Why does Gulliver become weak over time? How does the farmer exploit this situation?

(13)

<vi> Octose ($C_8H_{16}O_8$) and Nanose ($C_9H_{18}O_9$) — are can not found in nature but can prepared artificially.

STRUCTURE OF MONOSACCHARIDES: — The structural formula of monosaccharide carbohydrate are found either in the form of straight chain or rings. After methylation of glucose penta methyl ether is formed in which five hydroxyl groups are present which are associated with separate carbon atoms. This shows that the structure of glucose is stable.

RING STRUCTURE: — The ring structure of monosaccharide carbohydrate are of two types: —

<1> PYRANOSE

<2> FURANOSE

<1> PYRANOSE: — Such type of structure is found in the form of hexagonal structure with five carbons and one oxygen. eg: — Glucose and galactose.

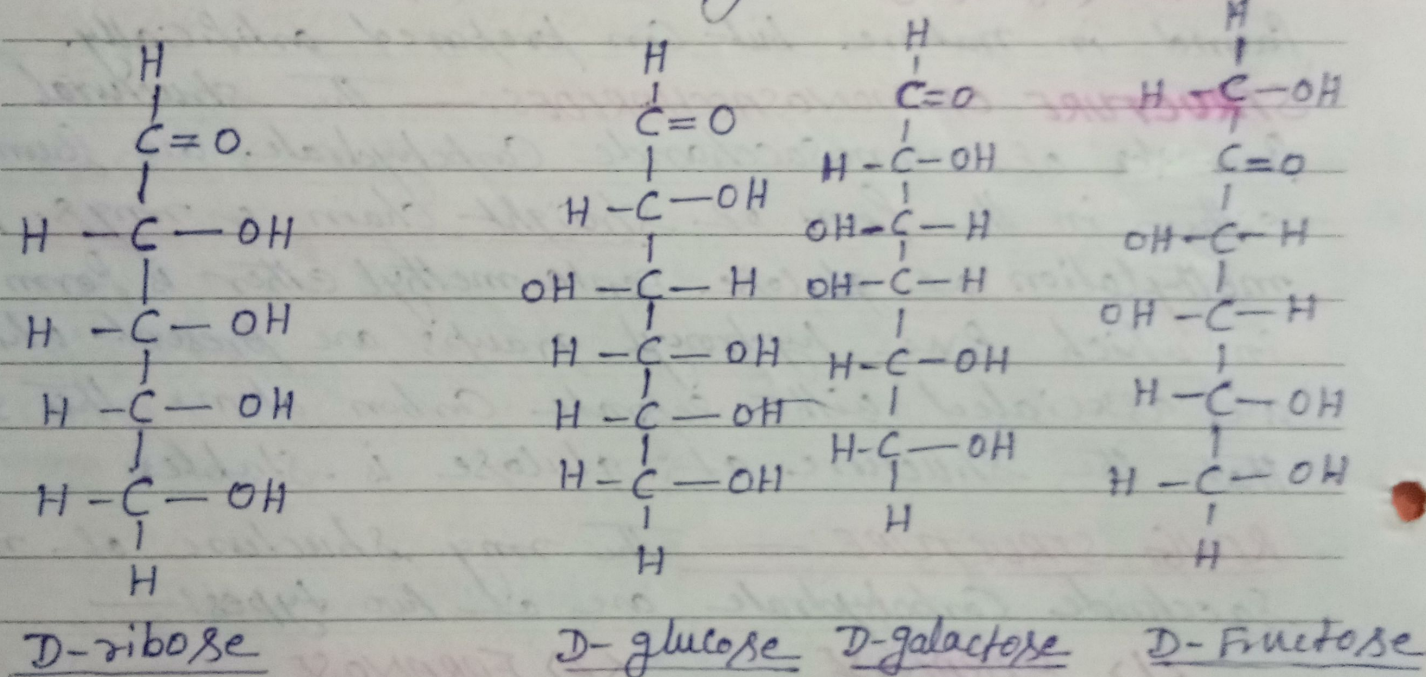
<2> FURANOSE: — Such type of structure is found in the form of pentagonal structure with four carbons and one oxygen. eg: — Fructose.

2. Answer the following question in about 150 - 200 words:

What transformation does Gulliver undergo as a result of his adventures? Why?

(4)

Both pyranose and furanose types are further divided into α and β types. In α types the hydroxyl group of near Carbon written below but in β type it is written above. Many monosaccharides have asymmetric carbons which may be of two types. If hydroxyl group is situated in right side then it is called D or dextrorotatory and if hydroxyl group is situated in left side then it is called L or laevorotatory.



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