Biomolecules

SHORT ANSWER-I TYPE QUESTIONS (2 Marks)

Q. 1. Define the following terms in relation to proteins:

(i) Peptide linkage (ii) Denaturation

Ans. (i) Peptide linkage: A link between two amino acids with loss of water

- CO – NH – peptide linkage.

(ii) A process that changes the three dimensional structure of native protein is called denaturation of protein. It results into breaking of hydrogen bonds and disulphide linkages. Thus, a completely denatured protein has a shape of random coil.

Q. 2. List the reactions of glucose which cannot be explained by its open chain structure.

Ans. (i) Despite having the aldehyde group, glucose does not give 2, 4 DNP test or Schiff's test.

(ii) It does not form hydrogensulphite addition product with $NaHSO_3$.

(iii) The penta acetate of glucose does not react with hydroxylamine indicating the absence of free – CHO group.

Q. 3. Explain what is meant by:

(i) Biocatalyst (ii) Peptide linkage

Ans. (i) Biocatalysts are the catalysts which increases the rate of metabolism/ biochemical reactions.

(ii) Peptide linkage: A link between two amino acids with loss of water/ CO– NH – peptide linkage.

Q. 4. Explain the following terms:

(i) Invert sugar (ii) Polypeptides

Ans. (i) An equimolar mixture of glucose and fructose produced on hydrolysis of sucrose is called invert sugar. It is called so because sucrose is dextro rotator whereas its hydrolysis product is laevo rotatory.

(ii) Polypeptides are polymers of amino acids containing less than 100 amino acids. For example, oxytocin, vasopressin, etc.

Q. 5. Explain what is meant by :

(i) Peptide linkage (ii) Glycosidic linkage

Ans. (i) Refer Q1 of SA-I type question

(ii) The linkage between the monosaccharide units through oxygen is called glycosidic linkage.

Q. 6. Name the product of hydrolysis of sucrose. Why is sucrose not a reducing sugar?

Ans. On hydrolysis, sucrose gives equimolar mixture of D-(+)-glucose and D-(-)- fructose. Sucrose is not a reducing sugar as glucose and fructose are linked through their reducing centers in structure of sucrose.

Q. 7. State clearly what are known as nucleotides and nucleosides.

Ans. A nucleoside contain only two basic components of nucleic acids *i.e.,* pentose sugar and nitrogenous base.

A nucleotide contains all the three basic components of nucleic acids *i.e.,* a phosphoric acid group, pentose sugar and nitrogenous base.

Q. 8. Describe what you understand by primary structure and secondary structure of proteins.

Ans. Primary structure of proteins: The protein in which amino acids linked with each other in a specific sequence is said to be the primary structure of that protein.

Secondary structure of proteins: It refers to the shape in which a long polypeptide chain can exist *i.e.,* □-helix and □-pleated structure.

Q. 9. What is essentially the difference between α-form of glucose and β-form of glucose? Explain.

Ans. α-form of glucose and β-form of glucose differ only in the configuration of the hydroxyl group at C_1 in cyclic structure of glucose/hemiacetal form of glucose.

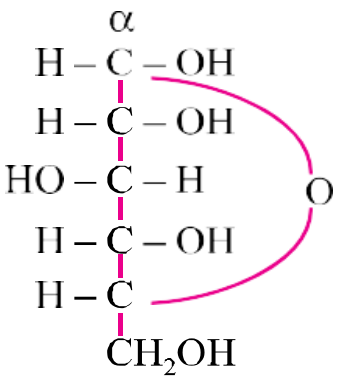
Q. 10. Explain: (i) Mutarotation (ii) Avitamineosis

Ans. (i) Mutarotation: Spontaneous change in specific rotation of an optically active compound with time, to an equilibrium value is called mutarotation.

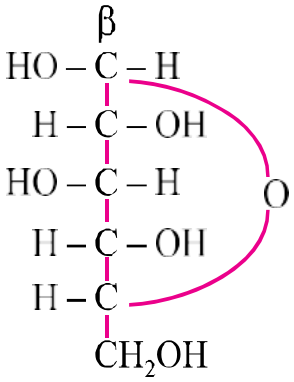
(i) **Avitamineosis:** Multiple deficiencies caused by lack of more than one vitamin is called avitamineosis.

Q. 11. What are anomers? Give the structures of two anomers of glucose.

Ans. Monosaccharides which differs in configuration at C-1, *e.g.,* α-glucose and β-glucose



α-Glucose

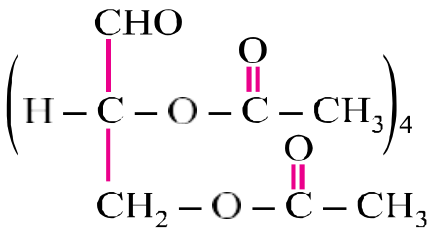


β-Glucose

Q. 13. (i) Acetylation of glucose with acetic anhydride gives glucose penta-acetate. Write the structure of penta acetate.

(ii) Explain why glucose penta acetate does not react with hydroxylamine ?

Ans. (i)



Glucose pentaacetate

(ii) The molecule of glucose penta acetate has a cyclic structure in which – CHO is involved in ring formation with – OH group at C-5.

Q. 14. What are vitamins? How are they classified?

Ans. Vitamins are a group of biomolecules (other than carbohydrates, fats and proteins) most of which cannot be produced by body but must be supplied in small amount to perform specific biological functions of the body.

Types:

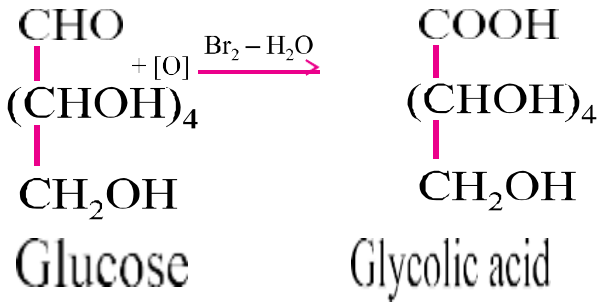
(i) Water soluble vitamins: Vitamin B and C.

(ii) Fat soluble vitamins: Vitamin A, D, E and K.

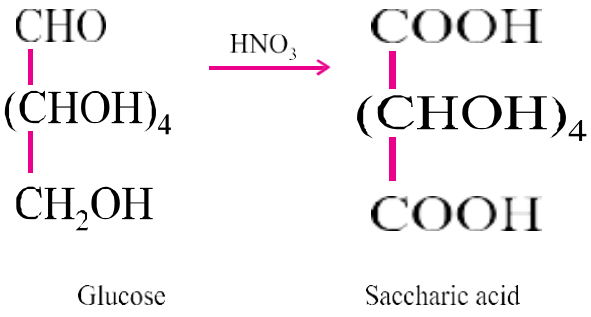
Q. 15. Write the products of oxidation of glucose with :

(i) Bromine water (ii) Nitric acid

Ans. (i)



(ii)



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