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KPK Class 11 Biology Conceptual Questions – Chapter 2

Biological Molecules

Q1: Define the following:

(a)Condensation (b)Hydrolysis:

- **Condensation** is a chemical reaction in which two molecules combine to form a larger molecule, with the elimination of a small molecule (usually water). It is also known as **dehydration synthesis**.
- **Hydrolysis** is the reverse process, where a large molecule is broken down into smaller molecules by the addition of water.

Q2: What are Different Kinds of Carbohydrates? Give two example of each.

- **Monosaccharides**: Simple sugars like glucose and fructose.
- **Disaccharides**: Composed of two monosaccharide units, e.g., sucrose (glucose + fructose) and lactose (glucose + galactose).
- **Polysaccharides**: Complex carbohydrates made up of many monosaccharide units, e.g., starch, cellulose, and glycogen.

Q3: Compare the Isomers and Stereoisomers of Glucose.

- **Isomers**: Molecules with the same molecular formula but different structural arrangements. Glucose has structural isomers like fructose and galactose.
- **Stereoisomers**: Molecules with the same structural formula but different spatial arrangements. Glucose has two stereoisomers: **alpha-glucose** and **beta-glucose**.

Q4: Give the chemical nature of the Glycosidic Bond.

- The glycosidic bond is a type of chemical linkage between monosaccharide units in disaccharides, oligosaccharides, and polysaccharides. It forms by the removal of a water molecule.

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Q5: How dehydration-synthesis and hydrolysis reaction are used for the making and breaking of macromolecule polymers.

- **Dehydration synthesis** builds macromolecule polymers by removing water molecules between monomers.
- **Hydrolysis** breaks down macromolecules by adding water molecules to break the bonds between monomers.

Q6: Outline the synthesis and breaking of Peptide Linkages?

- **Synthesis**: Peptide bonds form between amino acids during protein synthesis. Carboxyl (-COOH) of one amino acid reacts with the amino (-NH2) group of another, eliminating water.
- **Breaking**: Hydrolysis breaks peptide bonds, releasing individual amino acids.

Q7: Evalute Role of Steroids in the Human Body.

- Steroids are lipids with a characteristic four-ring structure.
- **Cholesterol**: Essential for cell membrane structure and precursor for steroid hormones.
- **Hormones**: Steroid hormones (e.g., cortisol, testosterone, estrogen) regulate various physiological processes.

Q8: Illustrate the Formation of Phosphodiester Bond.

- In polynucleotide chains (e.g., DNA and RNA), adjacent nucleotides are joined by phosphodiester bonds.
- These bonds link the phosphate group of one nucleotide to the sugar group of the next nucleotide via an oxygen bridge.

Q9: List some examples of Structural Proteins:

- **Collagen**: Provides strength to connective tissues (skin, tendons, bones).
- **Keratin**: Forms hair, nails, and outer skin layers.

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