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NATIONAL OFFICERS ACADMEY (NOA)
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Subject :- General Science and Ability

Mention the full qs statement for proper evaluation. Without that these are just notes and cannot be awarded marks

(ASSIGNMENT #01)

CARBOHYDRATES:-

the term "carbohydrates" is combination of two words, "Carbo" and "hydrate". "Carbo" is short form of Carbon and hydrate mean water, so they contain C, H and O, with empirical formula $C_x(H_2O)_y$. they are most abundant biomolecules on surface of earth. They are commonly called "sugars".

→ Classification:-

Carbohydrates are classified further into:-

1) Monosaccharides
2) Oligosaccharides
3) Polysaccharides

Monosaccharides:-

- these are simple sugars, which cannot be hydrolyzed.
- Common Examples are Glucose, Fructose

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- Their sources are Grape sugar, blood sugar, sweet fruits and honey.
- They are sweet in taste and soluble in water.

Draw the structures as well

- **Oligosaccharides:-**

- They are formed when 2 to 9 monosaccharide units combine through a bond (Glycosidic linkage).
- Common disaccharides are Sucrose (common table sugar), lactose and maltose and trisaccharides example raffinose.
- Their sources are sugar cane, sugar beet, mango apricot almond, coffee and honey.
- They are crystalline solids, soluble in water and sweet in taste.
- They are collectively known as Sugars.

- **Polysaccharides:-**

- They are insoluble in water and tasteless.
- They are called non-sugars.
- They are used as energy storage compounds in animals and plants in form of Glycogen and starch respectively.

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Characteristics:-

- CHO are compounds with large molecular weight.
- CHO are polyhydrated compounds having at least 3 carbon atoms and a potentially active carbonyl group.
- Almost all are derived from aldehyde or Ketones.
- They have in their molecules mainly C, H and O.

Examples:-

- Leafy greens (Spinach, lettuce)
- Berries
- Starchy veggies (sweet potato, potatoes)
- Fruits (bananas, pineapple, papaya)
- Grains (rice, bread, cereals).

PROTEINS:-

The name protein is derived from "Proteios" meaning. Prime importance.

Characteristics:-

- They are polymers of Amino Acids.
- Proteins are colorless and tasteless.
- The solubility of protein depends upon pH (solubility increase with increase in acidity or alkalinity).

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- They are high molecular weight biomolecules.
- There are 10,000 different kinds of proteins in human body.
- They contain elements Carbon, Hydrogen, Oxygen and nitrogen.
- They may also contain phosphorous, Iron, copper, iodine, Sulphur and zinc.

- **Classification:-**

→ **Based on physical-chemical Propaties:-**

- **Simple Proteins:-**

These proteins are made of only one type of amino acid, its structural component. On decomposition of / with acids, they liberate constituent amino acids. They are mostly globular type of proteins. Examples are albumin, globulin, collagen etc. They are most abundant protein in animal Kingdom.

- **Compound or Conjugated Proteins:-**

The proteins, which is attached to some non-proteins groups (Prosthetic group). Examples are phospho-proteins, lipo-protein etc.

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Derived Proteins:

These proteins which are derived from simple or conjugated proteins from action of heat, enzyme or chemical agents. For examples, Proteoses, enzymes peptones, oligo peptides etc.

-> Based on Structure of Proteins:

Primary Protein:

Primary structure of protein is linear sequence of amino acids that make up polypeptide chain.

Secondary Protein:

The linear, unfolded structure of polypeptide chain assumes helical shape to produce secondary structure. The secondary structure refers to regular folding pattern of twists and kinds of polypeptide chain.

Tertiary Protein:

Tertiary structure of protein is three dimensional structure formed by bending and twisting of polypeptide chain. The linear sequence

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of polypeptide chain is folded into compact globular structure.

- **Examples:**
- Meat, fish, eggs, chicken etc.

LIPIDS:-

"lipids" words is derived from "Lipos" means Fat. Primary building block of lipids are Fatty Acids, Glycerol and alcohols.

- **Characteristics:**
- They are most heterogeneous group of substances.
- They are insoluble in water.
- Soluble in organic compounds like ether, alcohol chloroform, benzene etc.
- Fats, Oils and Steroids are most important lipids found in nature.
- They are poor conductor of heat and electricity.
- They not only occupy place in human diet but also used as a raw material in manufacturing of soap, detergents, varnishes, paints, polishes, cosmetics and pharmaceuticals.

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- **Classification**

- **Simple lipids:**

These are compounds of fatty acids with glycerol. For example; common fats and oils.

- **Compounds lipids:**

These are compounds of fatty acids with glycerol and possess additional groups also. For example, phospholipids (Phosphoric Acid), Glycolipids (carbohydrates), lipoprotein.

- **Derived lipids.**

These are substances derived from simple and compound lipids by hydrolysis. Examples are steroids, vitamin D and Terpenes.

Examples:

cheese, Butter, Ghee, Yogurt, oil etc.

Overall good structure and presentation