

(General Science and Ability)

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Batch: 56

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

1- Carbohydrates:

→ Carbohydrates are defined as polyhydroxy (with many OH) aldehydes or ketones, or complex substances which yield polyhydroxy aldehyde or ketone subunits on hydrolysis.

→ Their general formula is $C_x(H_2O)_y$.

Classification:

(A) Monosaccharides:

- 1- They are simple sugars.
- 2- They are sweet in taste.
- 3- They are easily soluble in water.
- 4- All carbon atoms except one carbon in a monosaccharide have hydroxyl group. The carbon without OH group forms aldehyde or ketone group.
- 5- They cannot be hydrolyzed into simple sugars.

Example: Glucose (hexose sugar)

(B) Oligosaccharides:

- 1- These are comparatively less sweet in taste.

Also draw the structures

2- These are less soluble in water.

3- They yield 2 to 10 monosaccharides on hydrolysis.

4- oligosaccharides which give two monosaccharides on hydrolysis called disaccharides.

5- oligosaccharides which give three monosaccharides on hydrolysis called trisaccharides.

Examples: Sucrose, maltose, lactose etc.

(C) Polysaccharides:

1- They are tasteless.

2- They are hardly soluble in water.

3- They are usually branched or unbranched.

4- Several monosaccharides linked by glycosidic linkage and form Polysaccharides.

5- They have high molecular weight.

Examples: Glycogen, starch

Glycogen:

1- It is also called animal starch.

2- It is a chief storage compound of animals.

3- It gives red colour with iodine.

Cellulose:

1- It is the most abundant carbohydrate in nature.

2- Cotton is pure form of cellulose.

3- It is main constituents of cell wall of plants.

Sources?

2-Lipids: Definition

→ Lipids are heterogeneous group of compounds related to fatty acid. They are insoluble in water but soluble in organic solvents, like alcohol, ether, chloroform and benzene.

Classification:

(A) Acyl glycerols (Fats):

→ Chemically, acylglycerols are defined as esters of fatty acids and alcohols.

→ The most abundant acylglycerol is triacylglycerol. It is also called triglycerides or neutral lipids.

Fatty acids:

→ Fatty acids contain even number (2-30) of carbon atoms in straight chain with attached hydrogen and having an acidic group COOH (carboxylic group).

(a) Saturated fatty acids: They contain no double bond e.g. palmitic acid, Butyric acid etc.

(b) Unsaturated fatty acids: They contain up to six double bonds. e.g. oleic acid

(B) Waxes:

→ Chemically, waxes are mixture of long chain alkanes (with odd number of

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Carbon from C_{25} to C_{35} , alcohols, ketones, and esters of long chain fatty acids.

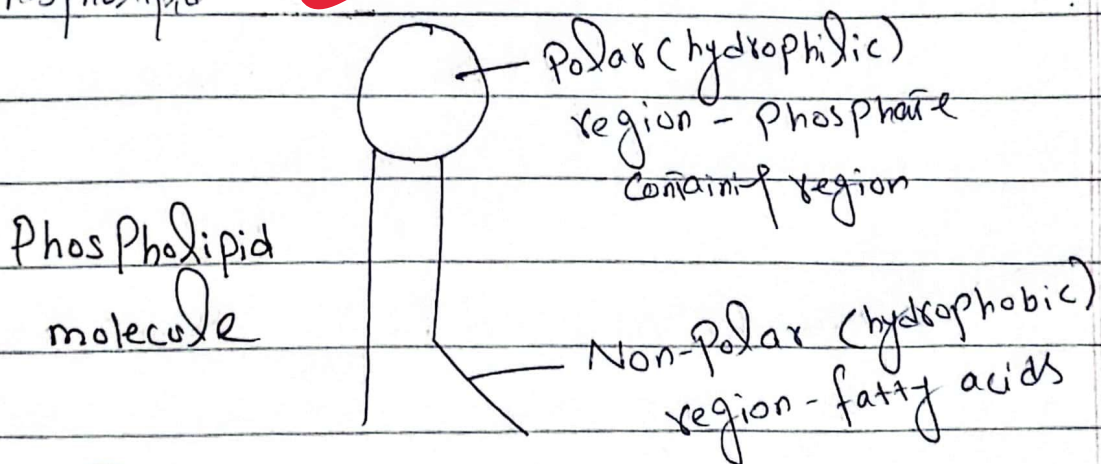
In Plants: They form protective coating on fruits and leaves. Waxes protect plants from water loss.

In animals: Some insects secrete waxes. They also provide water barrier in insects, birds etc.

(C) Phospholipids:

→ Phospholipids are derivative of Phosphatidic acid. Nitrogen bases like choline, ethanolamine and serine are important component of Phospholipids.

Phosphatidylcholine is the most common Phospholipid.



(D) Terpenoids:

→ Terpenoids are made up of the simple repeating units of isoprenoid. This unit undergoes condensation by different ways and form different compounds.

Examples: Carotenoids, Steroids, Terpenes etc.

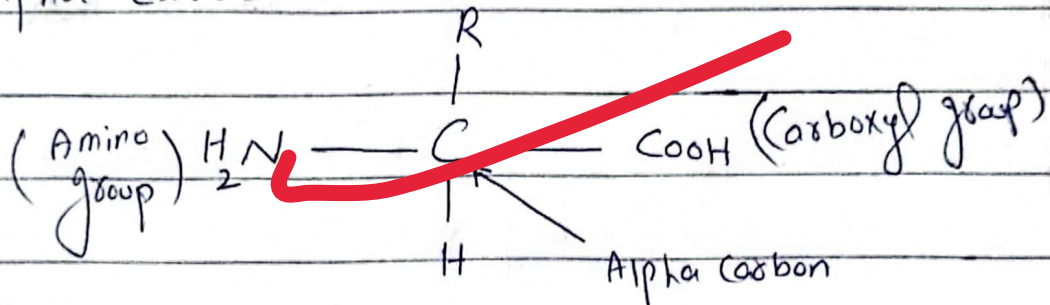
3-Proteins:

Definition:

→ Proteins are polymers of amino acids containing carbon, nitrogen, oxygen and hydrogen. The number of amino acids is different in different proteins. It may be from a few to 3000 or more.

Amino acids:

→ All amino acids have an amino group (NH_2) and a carboxyl group (COOH), attached to the same carbon atom, also known as alpha carbon.



Some important functions of Proteins:

- 1- They build many structures of cells like cell membrane.
- 2- All enzymes are protein in nature. These enzymes control the metabolism of cell.
- 3- Hormones are also protein in nature.
- 4- Some proteins are called antibodies. Antibodies defend the body against pathogens.

Classification:

→ Proteins are divided into two types on the basis of their structures.

(a) Fibrous Proteins:

- 1- Their molecules are composed of one or more polypeptide chain.
- 2- Secondary structure is most important in them.
- 3- They are insoluble in aqueous media.
- 4- They are non-crystalline and are elastic in nature.
- 5- They perform structural role in cells and organisms.

Examples: myosin (in muscle cells), Keratin (of nails and hairs) etc.

(b) Globular Proteins:

- 1- They have multiple folding of polypeptide.
- 2- Tertiary structure is the most important in them.
- 3- They are soluble in aqueous media.
- 4- They can be crystallized.
- 5- They become denatured with change in physical environment.

Examples: Enzymes, antibodies, hormones