

# (General Science and Ability)

Name: DANISH AMIN

Batch: 56

## 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.

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.



## 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  $\text{COOH}$  (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



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

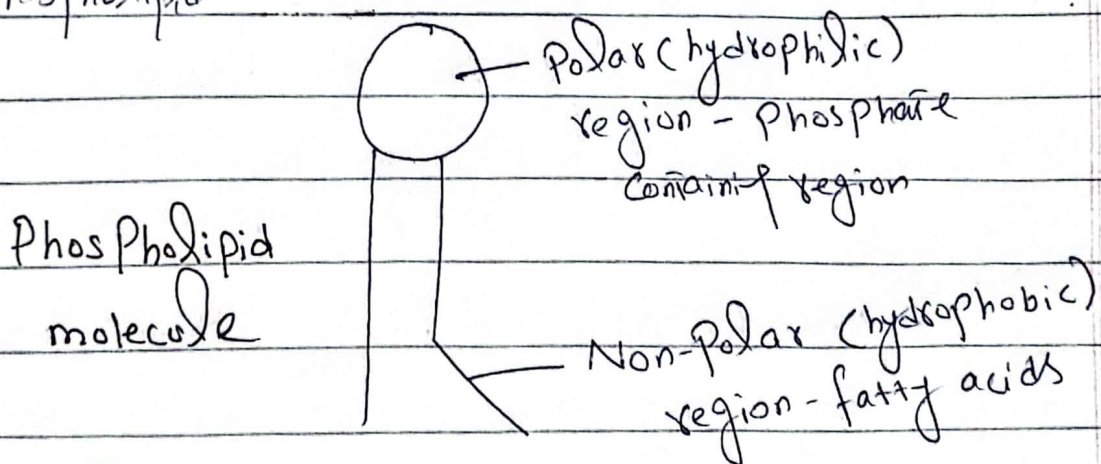
**In Plants:** They form protective coating on fruits and leaves. Waxes protect plants from water loss.

**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.



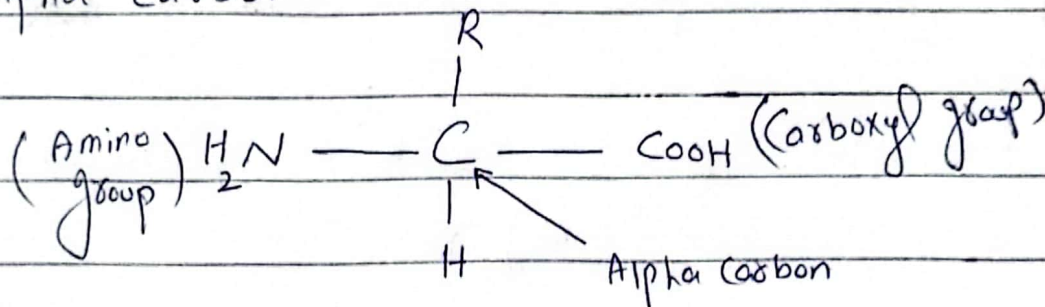
### 3-Proteins:

#### 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 ( $\text{NH}_2$ ) and a carboxyl group ( $\text{COOH}$ ), 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