

## Assignment #2

Date \_\_\_\_\_ 20\_\_\_\_  
MTWTFSS

Q: Definition, characteristics, Classification, types and examples of Carbohydrates, protein and fats?

### Def: of Carbohydrates:

Carbohydrates or Carbs are sugar molecules. Along with protein, fats Carbohydrates are one of three main nutrients found in food and drinks. Body breaks down Carbohydrates into glucose, or blood sugar. Glucose or blood sugar is the main source of energy for body cells, tissue and organs.

### Def: 2

A Carbohydrate is an organic compound such as sugar or starch and is used to store energy.

### Classification of Carbohydrates:

Carbohydrates are classified in to three main categories based on their chemical structure and complexity.

(i) Monosaccharides.

(ii) Disaccharides.

(iii) Polysaccharides.



(i) **Monosaccharides:**

(i) Glucose

(ii) Fructose

(iii) Galactose.

(ii) **Disaccharides:**

Carbohydrates composed of two monosaccharides unit link together.

**Examples:**

(i) Sucrose (glucose + fructose)

(ii) Lactose (glucose + galactose)

(iii) Maltose (glucose + glucose)

(iii) **Polysaccharides:**

Complex carbohydrates consisting of long chains of monosaccharides units.

**Examples:**

(i) Starch

(ii) Glycogen

(iii) Cellulose.



## Characteristics of Carbohydrates:

⇒ They are sweet in taste. They are soluble in water. They contain 3 to 70 carbon atoms, 2 or more hydroxyl (OH) groups and one aldehyde (CHO) or one ketone (CO) group. The simplest group of carbohydrates and often called simple sugar since they cannot be further ~~of~~ hydrolysed.

## Def: Protein:

Proteins are large and complex biomolecules made up of long chains of amino acid residues that play a crucial role in cells. Proteins contain carbon, hydrogen, oxygen, nitrogen and sulphur.

## Classification of Protein:

Protein can be classified based on various criteria, such as their structure, function, composition and solubility. These are the main classification of proteins.

### (i) Based on Function:

(i) Enzymatic Protein:

e.g. amylase, DNA, Polymerase.



(i) Structural protein:  
e.g. hemoglobin, albumin.

(ii) Regulatory Protein.  
e.g. insulin, transcription factors.

(iii) Defence protein  
e.g. antibodies, fibrinogen.

(iv) Storage Protein.  
e.g. ferritin, casein.

## Protein based on Composition:

1 → Simple proteins.  
e.g. include globulins and albumins.

2 → Conjugated protein.

i) Glyco proteins

ii) Lipo protein

iii) Metallo protein.

iv) Nucleo protein.

## Protein based on Solubility:

(i) Fibrous Protein

(ii) Globular Protein.



## Based on Nutritional value:

- (i) Complete protein
- (ii) Incomplete Protein.

## Protein based on origin:

- (i) Animal proteins  
e.g. meat, egg, fish.
- (ii) Plant proteins.  
e.g. legumes, grains, nuts.

## Characteristics Of Protein:

- ⇒ Proteins are high molecular weight compounds
- They are made of several amino acids.
  - The backbone of all proteins molecules is made up of amino acids.
  - Proteins are colorless and tasteless (except serine which is sweet).
  - Proteins are considered bricks, they make up bones, muscles, hairs, and other parts of the body.
  - The diffusion rate of protein is extremely low.



## Def: Fats

A type of nutrient that we get from our diet. It is essential to eat some fats, though it is also harmful to eat too much.

⇒ Fats, also known as lipids, are a diverse group of compounds that are insoluble in water but soluble in organic solvents.

## Composition of Fats:

- The main components of edible fats and oils are triglycerides.
- The minor components include mono- and diglycerides, free fatty acids, phosphatides, sterols, fat-soluble vitamins, tocopherols, pigments, waxes, and fatty alcohols.
- Animal fats contain smaller amounts of minor components.

## Types of Fats:

- i) Saturated fat
- ii) Unsaturated fat



## Saturated fat:

A type of fat in which the fatty acids fat chains have all single bonds between the carbon atoms.

### Examples:

- i) Butter
- ii) ghee
- iii) lard
- iv) Coconut oil
- v) Palm oil
- vi) Poultry
- vii) full-fat dairy product.
- viii) beef.

## Unsaturated fat:

A type of fat containing a high proportion of fatty acids molecules with at least one double bond, considered to be healthier in the diet than saturated fat.

### Examples:

- i) Avocados
- ii) olives
- iii) nuts, seeds
- iv) dark chocolate
- v) oils such as olive oil, canola and soybean.
- vi) fatty fish.



## Characteristics of fats:

- Provide energy for the body: fats provide 9 calories per gram.
- protect the body: body fat can help provide cushion to the body and protect the vital organs.
- Insulate the body: body fat helps to insulate the body and regulate body temperature.
- Keeps cholesterol and blood pressure under control, and helps your body absorb vital nutrients.
- Fat helps the body absorb VA, VI and VE. These vitamins are fat-soluble, which means they can only be absorbed with the help of fats.