Attempt on lined loose sheets for better practice!

What are Carbohydrates? (Carbohydrate Definition)

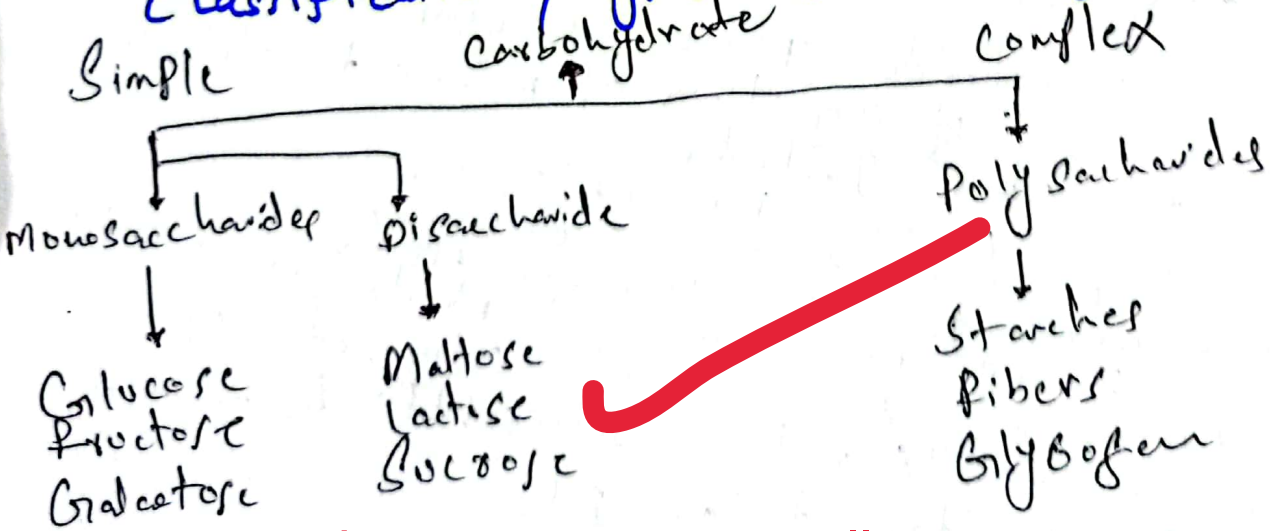
Carbohydrate or carbs are the body's primary fuel. Carbohydrate are organic compounds composed of carbon, hydrogen, oxygen. The ratio of oxygen and hydrogen in carbohydrate is same as water i.e 2:1.

$Cn(H_2O)n$ is the generic formula for all carbohydrates.

Wohlford says 45% to 65% of calories per day should come from carbohydrates.

Carbohydrate serves as the primary energy source for the body, particularly for the brain and muscles during physical activity. They also play critical role in the structure and function of cells, tissues, and organs.

Classification / Types of Carbohydrate



Draw the structures as well

(Simple Carbohydrate): Simple carbohydrates are basic types of carbs:

1- Monosaccharides: These are the simplest form of carbohydrates, consisting of a single sugar molecule - Examples include.

- Glucose: A prime energy source for the cells
- fructose: found in fruits and honey -
- Galactose: Part of Lactose found in milk.

2- Disaccharides: These consist of two monosaccharides molecules linked together, Examples Include:

- Sucrose: Common table sugar, composed of glucose and fructose —
- Lactose: found in milk, compose of glucose and galactose —
- Maltose: found in germinating grains, composed of two glucose molecules —

(Complex Carbohydrate)

Complex carbohydrate represent an important energy source for the body - They provide the sustained fuel the body needs for exercise, daily living activities and even rest -

Polysaccharide: These are complex carbohydrate composed of long chains of monosaccharide units - Examples Include:

Starch: A storage form of glucose in plants - found in potatoes, rice, corn -

Glycogen: A storage form of glucose in animals, found in liver and muscle tissues -

Cellulose: A structural component of plant cell walls — Indigestible by humans, but provides dietary fiber —

Improve the hand writing and the paper presentation

Characteristics of Carbohydrate

1 - Primary Energy Source: Carbohydrates are the body's main source of energy - for example, Glucose is a critical energy provider, especially for the brain and muscles during physical activity -

2 - Structural Components: Some carbohydrates provide structural support. For instance, cellulose is a key structural component of plant cell walls -

3 - Solubility: Simple carbohydrates (monosaccharide and disaccharide) are generally soluble in water, making them easily transportable in the blood stream - Example Includes Glucose and Sucrose -

4 - Complexity: Carbohydrates range from sugars to complex polysaccharides. For example, Starch found in potatoes and grains) and Glycogen (stored in animals livers and muscles) are complex carbohydrates -

5 - Digestibility: While most carbohydrates are digestible by humans and they function as dietary fiber -

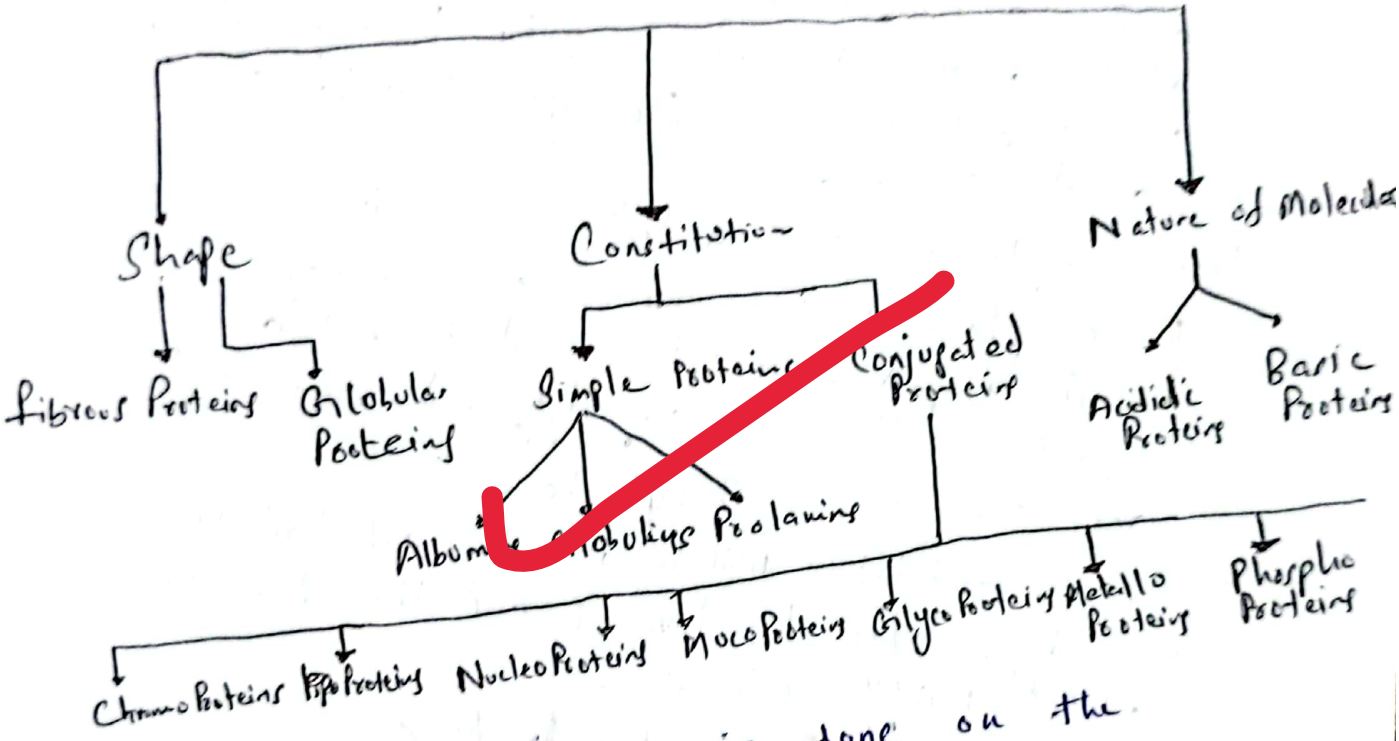
Examples of Carbohydrates

- Dairy Products - Yogurt, Milk, Ice-cream -
- Fruits - fruit juice, Whole Fruit -
- Grains - Cereal, Bread, Wheat, Rice
- legumes - Plant based proteins, Beans -
- Starchy Vegetables - Corn, Potatoes -

(Proteins Definition)

Proteins are large complex molecules made up of amino acids, which are organic compounds containing an amino group, a carboxyl group, and a unique side chain. Proteins are essential for various bodily functions, including building and repairing tissues, producing enzymes and hormones, and supporting immune function.

Classification of Proteins



Classification of Proteins is done on the basis of following —

On the basis of Shape:

1- fibrous Proteins: We can find these proteins in animals and are insoluble in water. eg:- Collagen, actin, myosin, keratin in hair feathers etc.

3 - Globular Proteins
These Proteins unlike, Fibrous Proteins are soluble in water. They are made up of Poly Peptide that are coiled about themselves to form oval or spherical molecules.
Eg:- albumin, insulin and harmones like oxytocin -

On the basis of Constitution

1 - Simple Proteins: These Proteins are made up of amino acids only e.g. albumins, globulins, Prolamins etc -

2 - Conjugated Proteins: These are complex proteins that are combined with the characteristic of non-amino acid substance called as a prosthetic group -
These are of following types:
- Nucleoproteins: Combination of Protein and nucleic acid -
- Mucoproteins: combination of Proteins and carbohydrate (> 4%)
- Glycoproteins: Combination of Proteins and carbohydrate (< 4%)
- Chromo Proteins: Combination of Proteins and coloured Pigments -
- Lipo Proteins: combination of Proteins and lipids -
- Metalloproteins: combination of Proteins and metal ions -
- Phosphoproteins: Combination of Proteins and phosphate group -

On the basis of nature of Molecules

2 - Acidic Proteins: They exist as anion and contain acidic acids.
e.g:- blood [illegible] -

3 - Basic Proteins - They exist as cations and are rich in basic amino acids e.g:- lysine, arginine -

Characteristics of Proteins

1 - Structural functions: Proteins provide structural support to cells and tissues - Collagen, for instance, is a protein that strengthens connective tissues, skin, bones.

2 - Enzymatic Activity: Many proteins function as enzymes, catalyzing biochemical reactions. For example, amylase is a enzyme that helps digest carbohydrates -

3 - Transport and Storage: Some proteins transport and store molecules. for eg: ferritin stores iron, hemoglobin transports oxygen -

4 - Immune functions:
Proteins play a vital role in the immune system - Antibodies are proteins that help identify and neutralize pathogens like bacteria and viruses -

5 - Hormonal Regulations: Hormones are majorly composed of Proteins - Hormones play a vital role in regulating muscle mass, sex hormones, growth and development -

Examples of Proteins

=) Meat and fish
=) eggs
=) dairy Products
=) Seeds and nuts
=) legumes like beans and lentils -

What are fats (Definition)

According to nutrition facts, fats are an essential part of diet and play an Important role in maintaining a healthy life —

fats also known as lipids, happens to be the most concentrated source of energy in the diet that provide about 8 to 9 calories per gram while on the other hand Proteins and Carbohydrates have only four calories per gram -
fat is known to have three element which Include carbon, hydrogen, oxygen, but It has more carbon and hydrogen than oxygen, leading to nine calories per gram -
fats are the source of energy in food, they are combinations of saturated and unsaturated fats — fats also helps the body absorb and transport the vitamins A, D, E and K through the bloodstream -

Classification of fats

1 - Saturated fats: They have no double bonds between the carbon atoms in their fatty acid chains, resulting in a straight structure - They are typically solid at room temperature - Examples include:
- Butter
- Lard
- Coconut Oil

2 - Unsaturated fats: They have one or more double bonds in their fatty acid chains - causing bends or kinks in the structure - They are usually liquid at room temperature - They are further classified into:

Monosaturated fats: Contain one double bond - Examples include:
- Olive Oil
- Canola Oil
- Avocad oil

Polyunsaturated fats: Contain two or more double bond -
- fish Oil
- Flaxseed oil
- Sunflower oil

3 - Trans fats: These are unsaturated fats that are hydrogenated to make them more solid and stable, often used in processed food - Examples include -
- Partially hydrogenated oils
- Margarine

4- Phospholipids: These contain two fatty acid chains and phosphate group, are major components of cell membranes.
Examples Include:
. Lecithin: found in egg yolks and Soybeans -

5- Steols: These are sub group of steroids and include Cholesterol, which is a precursor to steroid harmones -
Examples Include:
. Cholestrol: found in animal products like meat and dairy -
. Ergosterol: found in fungi and used to synthesize vitamin D -

Characteristics of fats

1- Energy storage: fats provide more than twice the energy per gram compared to carbohydrates and proteins - for example, triglyceride stored in adipose tissue act as an energy reserve -

2- Insulation and protection: fats insulate the body and protect vital organs. for instance, subcutaneous fat help maintain body temperature -

3- Cell membrane structure: Phospho lipids, a type of fat, are critical components of cell membranes, contributing to membrane fluidity and function -

4. Absorption of Vitamins: fats are essential for the absorption of fat soluble vitamins (A, D, E, and K) for example Dietary fat aids in the absorption of vitamin D from [illegible] —

5- Harmone Production: fats are precursors for the synthesis of harmones - cholesterol, a type fat, is a precursor for steroids harmones such as estrogen and testoterone —

Some Examples of Fats:

- Almond
- Walnut
- Avocado
- Egg
- Olive Oil
- Sardine
- Meat
- Fish
- Some Dairy Products

Attempt proper questions (from past papers preferably) for better practice and evaluation