Mention proper questions for evaluation. Without that these are just notes and cannot be properly evaluated

Carbohydrates

Carbohydrates are the human body's key source of energy, providing 3.9 calories of energy per gram. When carbohydrates are broken down by the body, glucos is produced. Carbohydrates are organic compounds, these comprise of only carbon, hydrogen and oxygen.
Carbohydrates also known as saccharides, the word saccharide comes from Greek word Sakkron which means sugar.

Carbohydrates Classification

Carbohydrates are classified into simple carbohydrates (monosaccharide, oligosaccharide) and complex carbohydrates (polysaccharides).

Monosaccharides

Monosaccharides are often called simple sugars. They are the simplest sugars and cannot be hydrolyzed. They are subdivided into triose, tetrose, pentose, hynoses, heptoses etc.
Examples of monosaccharides are glucose, fructose, erythrulose, ribulose etc.

Glucose : The immediate source of energy for cellular respiration and "blood sugar".

Galactose: A sugar in milk and yogurt.

Fructose : A sugar found in honey.

However, glucose is considered as

Draw the structures as well

the fundamental unit of carbohydrates.

Oligosaccharides

Oligo means few. Oligosaccharides are compound sugars that yield 2 to 10 molecules of the same or different monosaccharides on hydrolysis. Oligosaccharides yielding 2 molecules of monosaccharides on hydrolysis is known as a disaccharide, and ones yielding 3 or 4 monosaccharides are known as trisaccharides and tetrasacchrides, respectively and so on.

Two monosacchrides can be linked together to form a double sugar or disaccharide. Three common disaccharides are:

Sucrose: Common table sugar = glucose + fructose.

Lactose: Major sugar in milk = glucose + galactose

Maltose: Produc of starch digestion = glucose + glucose.

Polysaccharides

Poly means many. Polysaccharides are compound sugars and yield more than 10 molecules of monosaccharides on hydrolysis. They are futher classified depending on the type of molecules produced as a result of hydrolysis.

They may be homo polysaccharides, i-e: monosaccharides are of the same types or hetro polysaccharides, i-e monosaccharides of different types. Examples of homo polysaccharides are starch, glycogen, cellulose, pectin. Hetero polysaccharides are Hyaluronic acid and chondroitin.

Charateristics of Carbohydrates

→ Carbohydrates are chemical compounds that contain oxygen, hydrogen and carbon atoms.
→ They contain large quantities of hydroxyl groups.
→ The simplest carbohydrates contain either an aldehyde group (polyhydroxy-aldehydes) or a ketone group (polyhydroxyketones).
→ Derivatives of the carbohydrates can contain nitrogen's, phosphates and sulpher compounds.
→ carbohydrates is also involved as structural component in cells, such as cellulose, which is found in the cell walls of the plants and chitin which is main component of fungal cell wall.

Examples of Carbohydrates

Following are the important examples of carbohydrates:

Add sources as well

- Glucose
- Galactose
- Maltose
- Fructose
- Sucrose

- Lactose
- Starch
- Cellulose
- Chitin

Proteins

Proteins are the chief-builders of the body. They are complex molecules made up of carbon, hydrogen, oxygen and nitrogen (sometimes sulphur and phosphorus). Protein are used to synthesize enzymes (e.g: pepsin, trypsin), hormones (e.g, Insulin adrenaline), carrier proteins (e.g, haemoglobin) and contractile proteins.

Composition of Proteins

The proteins are polymers made of monomers called the amino acids. Amino acids are relatively small nitrogen-containing molecules that serve as building blocks for proteins and other organic compounds.

1⇒ Non-Essential Amino Acids:

Non-essential amino acids can be manufactured from other amino acids or from simpler compounds already present in our body.

2⇒ Essential Amino Acids:

Nine of the 20 amino acids needed by adults cannot be synthesized in the body; they must be obtained from dietary sources. One cannot remain healthy if deprived of them for very long.

Classification of Proteins

1- On the basis of Structure of Proteins:

There are four structural levels of organization to describe the complex macromolecule, protein based on the degree of complexity of the molecule.

Primary Structure of protein:
Here proteins exist as long chain of amino acids arranged in a particular sequence. They are non-functional proteins.

Secondary structure of protein:
If the polypeptide chain is coiled into a spiral or helix to have a three dimensional structure, where the amino acids interact by the formation of hydrogen bonds e.g. keratin, silk fibers etc.

Tertiary Structure of protein:
Long polypeptide chains become more stabilize by folding and coiling, by the formation of ionic or hydrophobic bonds or disulphide bridges, this result in the tertiary structure of protein, e.g. globulins of blood.

Quaternary Structure of protein:
When a protein is an assembly of

more than one polypeptide or subunits of its own, this is said to be the quaternary structure of protein. e.g. haemoglobin and insulin.

2- On the basis of biological function:

Proteins can be grouped based on their metabolic function they perform.

Enzymatic Proteins:

They are the most varied and highly specialized proteins with catalytic activity. Enzymes catalyze a variety of reactions. e.g, Urease, catalse, cytochrome C etc.

Structural Proteins:

These proteins aid in strengthening or protecting biological structures. Example: collagen, elastin, keratin, etc.

Transport or Carrier Proteins:

These proteins help in transport of ions or molecules in the body. Example: myoglobin, haemoglobin, etc.

Nutrient and Storage Proteins:

These proteins provide nutrients / nutrition to growing embryos and store ions.

Characteristics of Proteins

→ The backbone of all protein molecules is made up of a linear chain of polypeptide.
→ Proteins are colorless and tasteless.
→ Plants are able to synthesize all these amino acids from breakdown of products of carbohydrates and reduced N.
→ Proteins are considered bricks, they make up bones, muscles, hairs, and other parts of the body.

Examples of Proteins

The crucial examples of protein within the body are:

→ collagen
→ Keratin
→ Hemoglobin
→ Insulin
→ Myoglobin
→ Trypsin
→ Tubulin
→ Myosin etc.

Lipids (Fats and Oils)

Lipids are naturally occurring organic compounds, commonly known as oils and fats. Lipids occur throughout the living world in mircoorganisms, higher plants and animals and also in all types of cell.
Lipid contributes to cell structure, provide stored fuel and also take part in many biological processes.

Types of Lipids

Fats can be classified into:

- Saturated
- Trans Fats
- Unsaturated

Saturated Fat:

Saturated fat is solid at room temperature, which is why it is also known as "Solid fat". It is mostly in animal foods such as milk, cheese and meat. Poultry and fish have less saturated fat than red meat.
Saturated fat is also in tropical oils, such as coconut oil, palm oil, and cocoa butter.
Saturated fat can raise your cholesterol. A healthy diet has less than 10% of daily calories from saturated fat.

Trans Fat :

This is a fat that has been changed by a process called hydrogenation. This process increases the shelf life of fat and makes the fat harder at room temperature.
Harder fat makes crispier cracker and flakier pie crusts.
Trans fats can raise your cholesterol, so eat as little trans fat as possible.
You will find it in :

- Processed foods
- Snack foods, such as chips and crackers.
- Cookies
- Some margarine and salad dressings.
- Foods made with shortening and partially hydrogenated oils.

Unsaturated Fat :

Unsaturated fat is liquid at room temperature. It is mostly in oils from plants. If you eat unsaturated fat instead of saturated fat, it may help improve your cholesterol levels. Try to eat mostly unsaturated fats.
Types of unsaturated fat are:
Monounsaturated fat
polyunsaturated fat

Monounsaturated Fat:

This fat is in avocado, nuts and vegetable oils, canola, olive and peanut oils. Eat food that are high in monounsaturated fats may help lower your "bad" LDL (low-density lipoprotein) cholesterol.

Monounsaturated fats may also keep "good" HDL (high-density lipoprotein) cholesterol levels high.

Polyunsaturated Fat:

This type of fat is mainly in vegetable oils such as safflower, sunflower, sesame, soybean, and corn oils.

polyunsaturated fat is also the main fat found in seafood.

Examples of lipids

There are different types of lipids. Some examples of lipids includes butter, ghee, vegetable oil, cheese, cholesterol and other steroids, waxes, phospholipids and fat-soluble vitamins.

All these compounds have similar features i.e, insoluble in water and soluble in organic solvents, etc.