MISSION M.B.BS

Date: 27/06/2022

Subject: ZOOLOGY

Topic : BIOMOLECULES - L3 Class: Standard XI

Instructions:

A

1. Saturated fatty acids are mostly

   ✔ **A.** solids at room temperature

   ✘ **B.** liquids at room temperature

   ✘ **C.** with lower melting points

   ✘ **D.** with variable melting points

   Saturated fatty acids have single bonds between the carbon atoms and have a higher melting point (melting point = the time required for a solid to melt). Therefore, these are usually solids at room temperature and require temperatures higher than room temperature to melt.

   Unsaturated fatty acids are those that have double bonds between the carbon atoms. These have a lower melting point and hence, are usually liquids at room temperature.

2. Which one of the following represents a phospholipid?

- ✔ **A.** Fatty acids + Glycerol + Phosphate group
- ✘ **B.** Fatty acid + Glycerol + Carbohydrate group
- ✘ **C.** Fatty acid + Phosphate group
- ✘ **D.** Fatty acids + Glycerol + Phosphorus

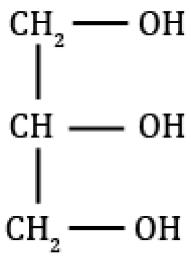
Phospholipid is a type of lipid molecule that is made up of fatty acid, glycerol and a phosphate group. These are present in the cell membranes. Example: Lecithin.

The compound lipid having fatty acid, glycerol and carbohydrate group is known as glycolipid. These are found on cell membrane surfaces and help in cell recognition.

3. Glycerol is also known as

- ✔ **A.** trihydroxy propane
- ✘ **B.** dihydroxy propane
- ✘ **C.** tetrahydroxy propane
- ✘ **D.** monohydroxy propane

Glycerol is an alcohol with three carbon atoms, five hydrogen atoms and three hydroxyl groups. Because of the presence of three hydroxyl groups, it is called trihydroxy. Propane is a three carbon alkane with the molecular formula C_3H_8. When three hydrogen atoms of propane are replaced by three hydroxyl groups, this gives rise to a molecule of glycerol.



Glycerol

4. The bond formed between glycerol and fatty acid in a simple lipid is

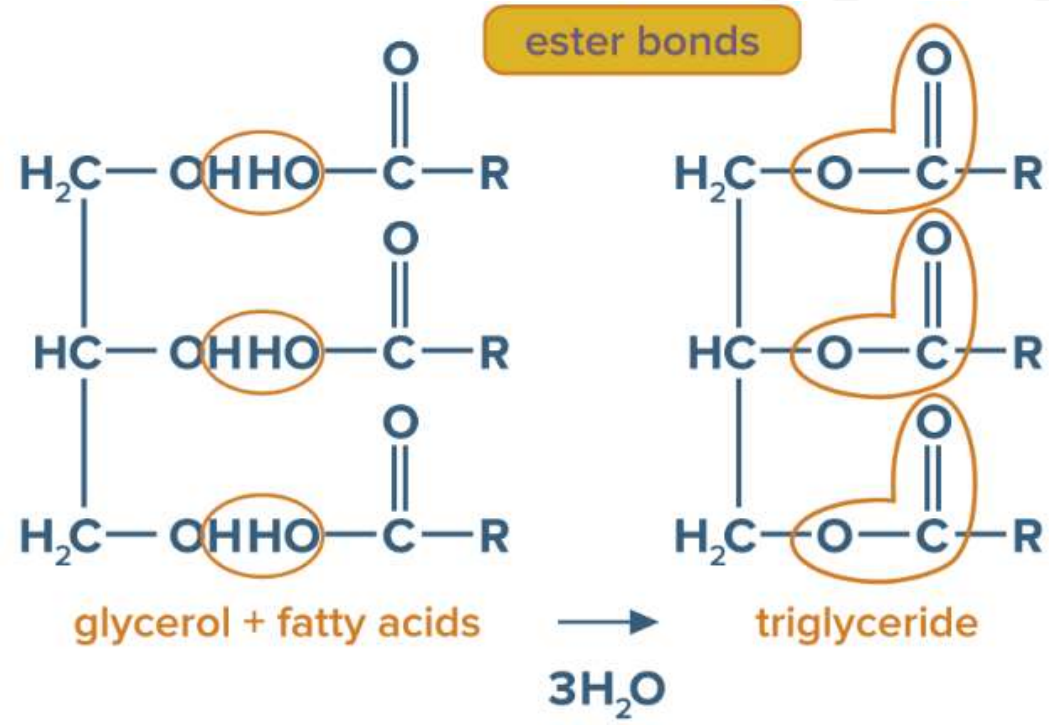
A. glycosidic bond

B. hydrogen bond

C. peptide bond

D. ester bond

A simple lipid is an ester of fatty acid with an alcohol, which in most cases is glycerol. An ester bond is formed when two groups are linked together by an oxygen atom.



A glycosidic bond is formed between two sugar units in a disaccharide, oligosaccharide or a polysaccharide chain.

A peptide bond is formed between two amino acids in a polypeptide chain.

A hydrogen bond is formed between the nitrogenous bases in a double-helical nucleic acid chain.

5. Most animal lipids are composed of _____ fatty acids whereas most plant lipids are composed of _____ fatty acids.

- ✗ **A.** unsaturated; saturated
- ✓ **B.** saturated; unsaturated
- ✗ **C.** saturated; saturated
- ✗ **D.** unsaturated; unsaturated

Animal lipids or fats are mostly composed of saturated fatty acids. Saturated fatty acids are solid at room temperature. They do not have double or triple bonds between carbon atoms in their structure. Ghee is an example of animal lipid or fat.

Plant lipids or oils are mostly composed of unsaturated fatty acids such as oleic acid, linoleic acids and linolenic acid. They are generally liquid at room temperature. They have double or triple hydrogen bonds between the carbon atoms along with single bonds in their structure. Examples of plant lipids or oils are sunflower oil and mustard oil.

6. Which one of the following is not a derived lipid?

- ✗ **A.** Steroid
- ✗ **B.** Carotenoid
- ✓ **C.** Arachidonic acid
- ✗ **D.** Acetone

Lipids are classified as simple, compound and derived based on their constituents.

Simple lipids are esters of fatty acids with alcohol e.g., oil, wax, and fats.

Compound lipids are esters of fatty acids with alcohol and with an additional group. Phospholipids which are simple lipids with a phosphate group are examples of compound lipids.

Derived lipids are substances derived from simple or compound lipids by hydrolysis. Examples are steroid, carotenoid and cholesterol.

Arachidonic acid is a fatty acid with 20 carbon atoms. It is not a derived lipid.

7. Which among the following is a phospholipid?

- ✓ **A.** Lecithin
- ✗ **B.** Arachidonic acid
- ✗ **C.** Cholesterol
- ✗ **D.** Linoleate

Lecithin is a phospholipid. Phospholipids are esters of two molecules of fatty acids with a glycerol molecule and also have phosphate group attached to it. It is a constituent of cell membranes.

Arachidonic acid is a fatty acid with 20 carbon atoms.
Linoleic acid is a fatty acid with 18 carbon atoms.
Cholesterol is a derived lipid found in cell membranes. It is composed of steroid and alcohol.

8. Which one of the following statements about fats is incorrect?

- ✗ **A.** The melting point of fats depends upon the chain length of the constituent fatty acid
- ✗ **B.** They are sparingly or not at all soluble in water but dissolve in an organic solvent
- ✗ **C.** They float on water as their specific gravity is less than 1
- ✓ **D.** They can be absorbed without emulsification

Emulsification is a process where large fat molecules are broken down into smaller ones for absorption. It is an important step (owing to their large sizes) taking place in the duodenum by the action of bile and then by the pancreatic enzyme lipase. They can be emulsified by shaking with water or with emulsifying agents in a laboratory.

9. Which of the following is/are not a lipid?

✗ **A.** Oils

✗ **B.** Fats

✗ **C.** Waxes

✓ **D.** None of the above

Lipids are polymers of fatty acids. They could be simple fatty acids or with glycerol or alcohols. They are insoluble in water. Oils and fats are esters of glycerol and three fatty acids. A wax is an ester of a long-chain alcohol and a fatty acid. Thus, oils, fats and waxes all are lipids.

10. Fat is hydrolysed by the enzyme lipase to yield

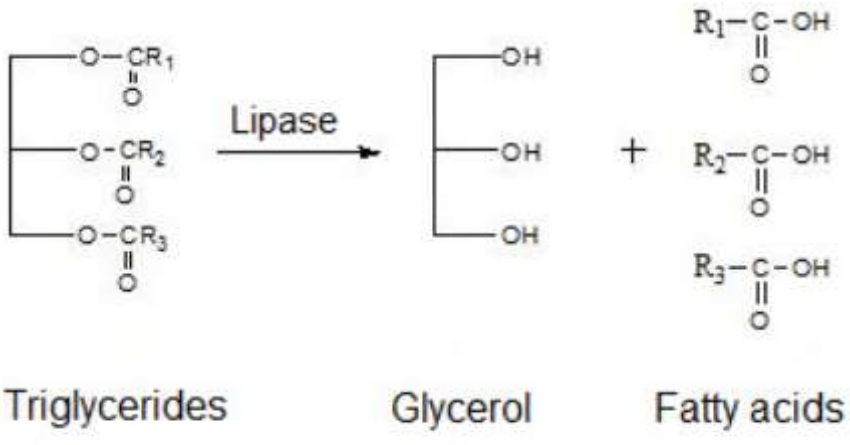
✗ **A.** fatty acid and amino acids

✓ **B.** glycerol and fatty acids

✗ **C.** glycerine and water

✗ **D.** glycerol and amino acids

Lipases are the enzyme that catalyses the hydrolysis of lipids or fats. They break down fats into fatty acids and glycerol.



Hydrolysis of triglycerides