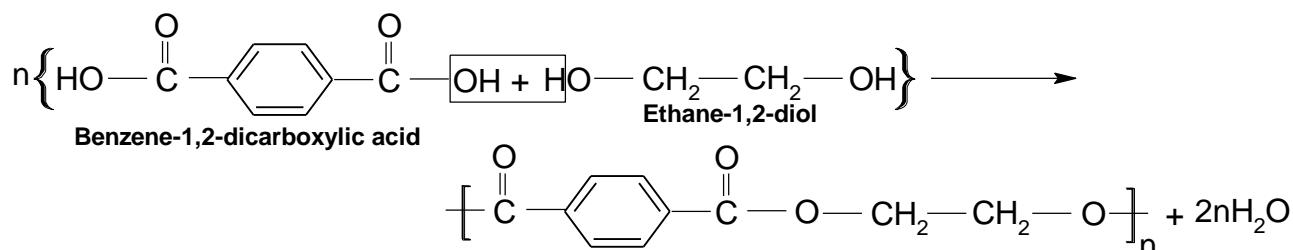


Macromolecules

1. Define with example condensation polymerization?

The type of polymerization in which monomers combine together with removal of small molecule i.e water or methanol. It takes place at both sides of the growing chain.

For Example:



2. What is saponification number?

Saponification Number:

It is the number of milligram of KOH required to saponify one gram of fat or oil. Normally there are three ester units in a molecule to be hydrolyzed. So for one mole of ester three moles of KOH are required.

3. What do you mean by rancidity of oil and fats?

Ans: The spoilage of fats or oils to give an odour is called rancidity. It is due to hydrolytic or oxidative reactions which release foul smell of aldehydes and fatty acids. Oils from the sea animals which contain a relatively high proportion of unsaturated acid chains rancid rapidly.

4. Define iodine number?

Iodine Number

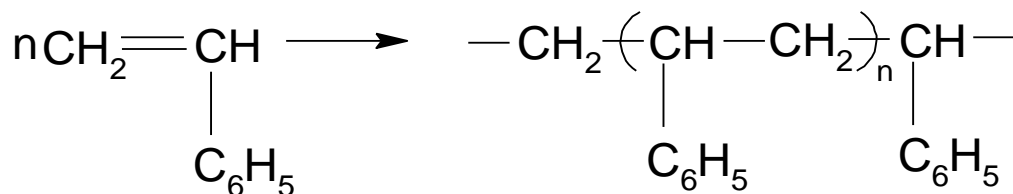
It is the number of grams of Iodine which will react with 100 g of fats and oils. The value of iodine number depends upon the number of double bonds present in the acidic components of glycerides. The glycerides with no double bond have zero iodine number.

5. What is difference between DNA and RNA?

DNA	RNA
It contains deoxyribose sugar.	It contains ribose sugar.
It is double strand.	It is single strand.
DNA has no types	RNA has types.
It has thymine.	It has uracil.

6. What is additional polymerization? Give an example.

It is an additional polymer and is obtained by polymerization of styrene in the presence of a catalyst.



7. Differentiate between thermoplastic and thermosetting polymers?

Thermoplastic Polymer	Thermosetting Polymer
A polymer which can be softened repeatedly when heated and hardened when cooled with a little change in properties is called thermoplastic polymer.	The polymer which become hard on heating and cannot be softened again are called thermosetting polymer.
They can be remold and reshape	They cannot be remold and reshape.
Weak intermolecular forces are present which become break on heating.	Strong intermolecular forces are present that is why thermosetting polymers on heating decompose instead of melting.
They are less brittle and soluble in organic solvents.	They are more brittle and insoluble in organic solvents.
They are formed by addition polymerization.	They are formed by condensation polymerization.
They have linear structure	They have 3D cross linked structure.
For example: PVC, plastic toys, polythene, nylon etc	For example: Bakelite, urea formaldehyde, synthetic varnish, epoxy resins etc

8. What are carbohydrates and how are they classified?

CARBOHYDRATES:

Polyhydroxy compounds of aldehyde and ketones are called carbohydrate.

They are called carbohydrates (hydrates of carbon) because they have general formula $C_x(H_2O)_y$.

They are called sugars because lower members are sweet in taste. They are most abundant biomolecules on earth.

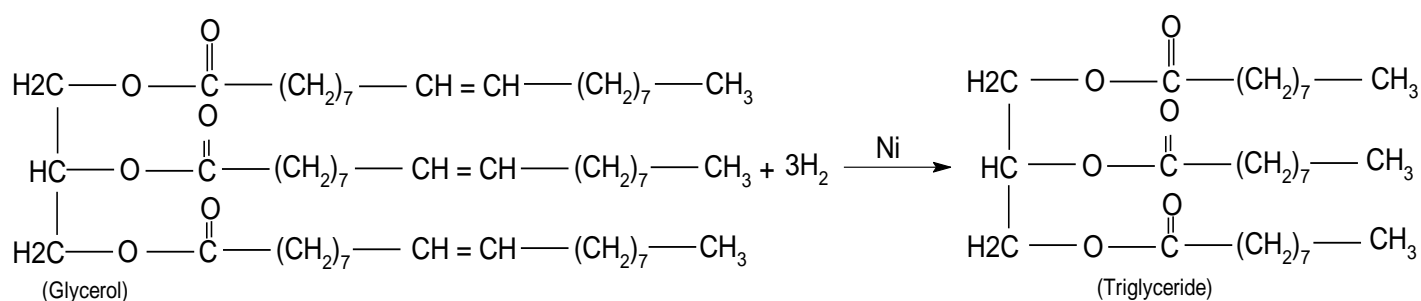
Classification of carbohydrates:

Carbohydrates are classified on the basis of pattern of hydrolysis.

- Monosacchrides
- Oligosaccharides
- Polysaccharides

9. What are triglycerides? Give an example.

Triglycerides are the triesters formed from glycerol and long chain acids called fatty acids.



Triglycerides may be solid or liquid depends on degree of unsaturation of fatty acids.

10. What are iso-enzyme and nucleotide?

Ans: Definition: The enzymes which belong to same organism and perform same function but chemically and physically they are different form each other are known as iso-enzymes.

Nucleotide:

11. What is chemical nature of enzyme?

Enzymes with few exceptions are protein in nature. They are produced by living cells but act in vivo as well as in vitro.

12. Give some properties of enzymes?

i. Specificity:

Enzymes are specific in nature which means that an enzyme will act on one substrate. For example: conversion of hexoses (glucose, fructose) to 6-phosphate derivative, hexokinase is used but glucokinase is specific for glucose only.

ii. Protein Nature:

Enzymes with few exceptions are protein in nature. They are produced by living cells but act in vivo as well as in vitro.

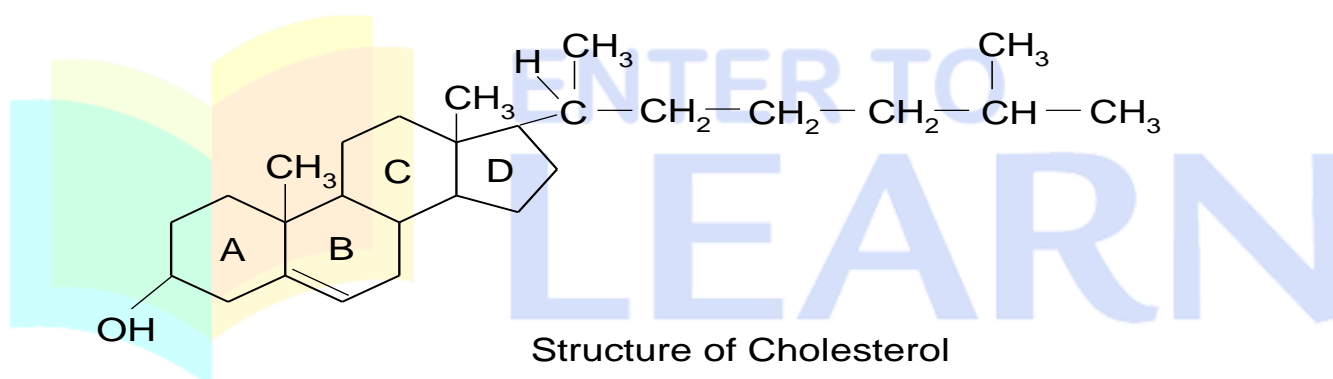
iii. Direction of enzyme reactions:

The most enzymatic reactions are reversible i.e the same enzyme can catalyze reaction in both directions.

iv. Isoenzymes:

The enzymes which belong to same organism and perform same function but chemically and physically they are different from each other

13. Give structural formula of cholesterol?

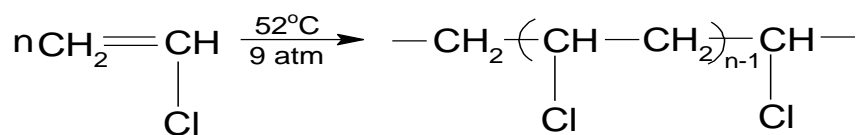


14. Give two differences of oil and fats?

Fats	Oils
1. These are saturated.	1. These are unsaturated.
2. They occur in solid state.	2. They occur in liquid state.
3. Their chief source is tallow.	3. Their chief source is vegetable oils.
4. They have high melting points.	4. They have low melting points.
5. They have greater chances to be rancid.	5. They have lesser chances to be rancid.

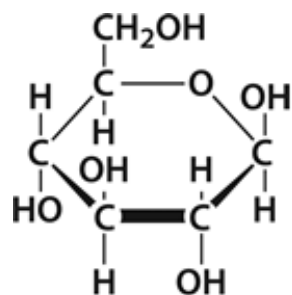
15. How PVC is prepared? Give its uses.

It is an addition polymer obtained by polymerizing vinyl chloride at 52°C and 9atm pressure.

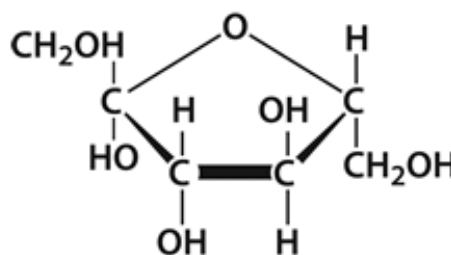


Addition of plasticizer improves the flexibility of the polymer. It is widely used in floor coverings, in pipes, in gramophone records etc.

16. Draw cyclic structure of glucose and fructose.



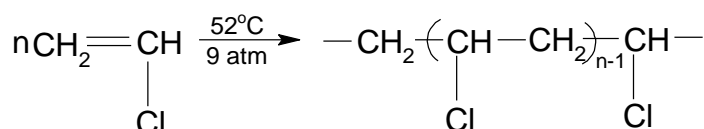
glucose



fructose

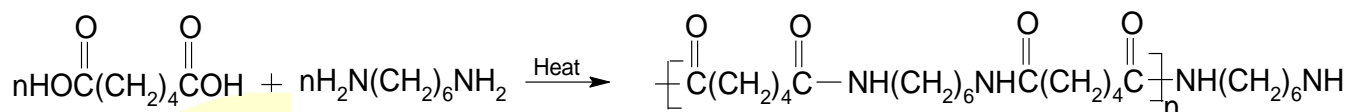
17. How polystyrene is prepared? Give its uses.

It is an additional polymer and is obtained by polymerization of styrene in the presence of a catalyst.



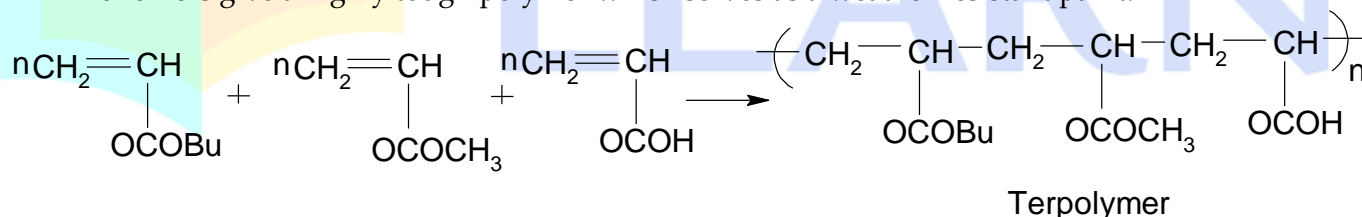
18. Give the preparation of nylon 6,6.

Nylon 6,6 is obtained by heating adipic acid with hexamethylene diamine.



19. Define terpolymer with an example.

In terpolymer three different monomers are polymerized and the polymerization reaction is carefully controlled. For example: combination of butyl acrylate, methacrylate and acrylic acid monomers give a highly tough polymer which serves as a weather resistant paint.

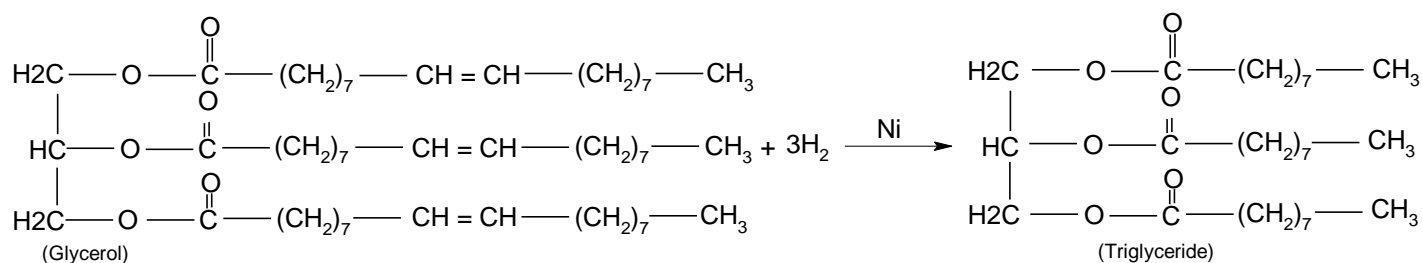


20. Write importance of Lipids.

- They are good source of energy and make the food more palatable.
- They exert an insulating effect on the nervous tissues.
- They are good energy reservoir in the body.
- Lipids are an integral part of cell protoplasm and cell membranes.
- Some lipids act as precursors of very important physiological compounds.

21. What do you understand by Hardening of Oil?

Unsaturated glycerides react with hydrogen in the presence of a metal catalyst to give saturated glycerides. The result in the conversion of liquid glycerides (an oil) into a semi solid glycerides (a fat). This reaction is used commercially to harden vegetable oil for the production of vegetable ghee. Hardened oils are also extensively used for making soaps and candle.



22. How temperature affects the activity of Enzyme?

The enzymatic reaction occurs best at or around 37°C which is the average normal body temperature. The rate of chemical reaction is increased by an increase in temperature but this is true only over a limited range of temperature. The enzymes usually destroy at high temperature. The activity of enzyme is reduced at low temperature. The temperature at which enzyme reactions occur at the fastest is called its optimum temperature.

23. Is starch a pure compound?

Ans: **Brief answer; Starch is not a pure compound.**

It is a mixture of two polysaccharides, amylose and amylopectin. Amylose is soluble in water and gives a deep blue colour with iodine, while amylopectin is insoluble and gives no colour. Natural starch consists of 10-20% amylose and 80-90% of amylopectin.

24. Enzymes are specific in their action. What does this statement mean?

Ans: Enzymes have specific site on their structure which are called binding sites. These can only fit into a specific substrate and not into all. So they are made for specific substrates. And they have highly specific action. For example, Zymase is specific for Glucose to convert it into ethyl alcohol and carbon dioxide. No other enzyme can convert glucose into ethanol.

25. What are activators?

Ans: Definition: Those inorganic compounds which when added to a reaction mixture, increases the enzyme activity are called activators.

Example: Mg^{+2} and Zn^{+2} are the activators for the phosphatase and carbonic anhydrases, respectively.

26. What is the effect of radiation on enzymes?

Ans: When enzymes are exposed to any kind of radiation like ultraviolet, X-rays, beta rays, gamma rays etc, they are readily inactivated.

27. What are uses of starch?

Ans: Starch is used in coating and sizing of paper to improve the writing qualities.

It is used in laundering and in the manufacture of glucose and ethyl alcohol.

Its aqueous solution is used in laboratory as an indicator for iodine titrations.

It is also used in pharmaceuticals as an additive in syrups and tablets.

28. Why cellulose is not digested in the human gastrointestinal tract?

Ans: Cellulose is not digested by human gastrointestinal tract because it does not contain enzymes cellulase, which is necessary for the digestion of cellulose. So rather than digestion it causes problems in the gastrointestinal tracts. Sometimes leads to vomiting also.

29. Why glycogen is called animal starch?

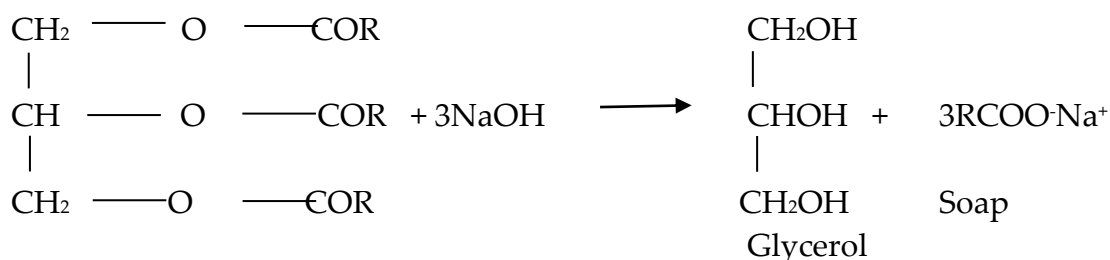
Ans: Animals store glucose in their body in the form of glycogen. It occurs mainly in the liver and muscles, where it represents the main storage polysaccharide in the same way as starch functions in the plant cells. Glycogen is therefore called as animal starch.

30. What is denaturation of proteins?

Ans: The structure of proteins can easily be disrupted by heat, change in pH and under strongly oxidizing or reducing conditions. Under such conditions the proteins undergo denaturation. The most familiar example of denaturation is the change which takes place in the albumin, the principle component of egg white, when it is cooked. So the denaturation is an irreversible change.

31. What is saponification?

Ans: Saponification is the hydrolysis of triglycerides of alkalies. Glycerol is produced along with sodium or potassium salt of fatty acids. These salts are called soaps.



32. What is rancidity of fats or oils?

Ans: The spoilage of fats or oils to give an odour is called rancidity. It is due to hydrolytic or oxidative reactions which release foul smell of aldehydes and fatty acids. Oils from the sea animals which contain a relatively high proportion of unsaturated acid chains rancid rapidly.

33. What is acid number?

Ans: It is the number of milligrams of KOH required to neutralize one gram of fat or oil. The acid number of fat or oil indicates the amount of free fatty acids present in it.

34. Just name four factors affecting the activity of enzyme?

Ans: Factors Affecting Enzyme Activity:

1. Enzyme Concentration
2. Radiation
3. Temperature
4. Effect of pH
5. Other Substances

35. Differentiate between conjugated and derived proteins. Give one example in each case?

Ans: **Compound or Conjugated Proteins:**

In these molecules the protein is attached or conjugated to some non-protein groups which are called prosthetic groups.

Example: Phospho-proteins are conjugated with phosphoric acid. Lipoproteins are conjugated with lipid substances like lecithin, cholesterol and fatty acids.

Derived proteins:

This class of protein includes substances which are derived from simple and conjugated proteins.

Example: Proteases enzymes, peptones, oligopeptides, polypeptides, etc.