

UNIT-I. (2 Marks)

① Define carbohydrate, classify them with suitable example.

* Carbohydrate may be defined as polyhydroxy aldehydes (or) ketones (or) compounds which produce them on hydrolysis.

* They are primarily composed of the elements Carbon, Hydrogen & oxygen.

Classification:

* Monosaccharides - Glucose, fructose.

* Polysaccharides - starch.

* Oligosaccharides -

→ Disaccharides - sucrose.

→ Trisaccharides - Raffinose.

→ Tetrasaccharides - Stachyose.

② Define polysaccharides. classify them with suitable examples.

Polysaccharides (Greek: poly - many) are polymers of monosaccharide units with high molecular weight (up to million). They are usually tasteless & forms colloids with water.

Classification.

→ Homopolysaccharides - starch, cellulose

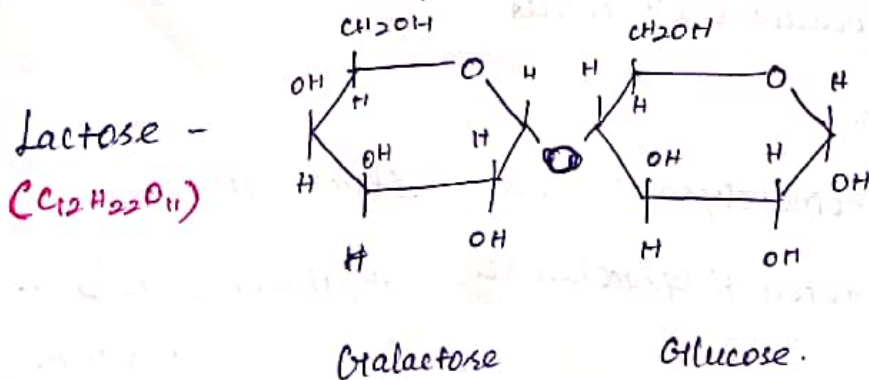
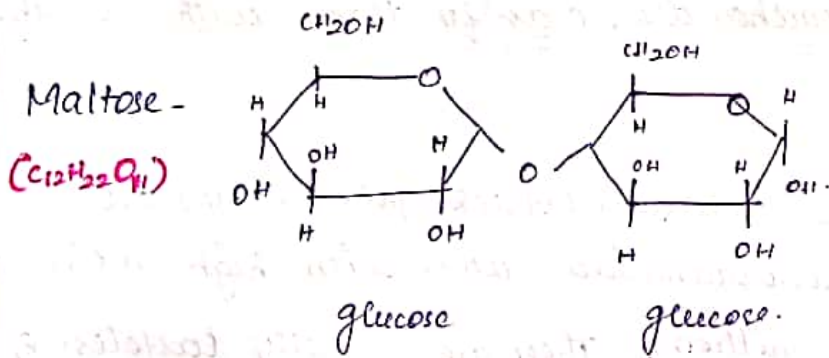
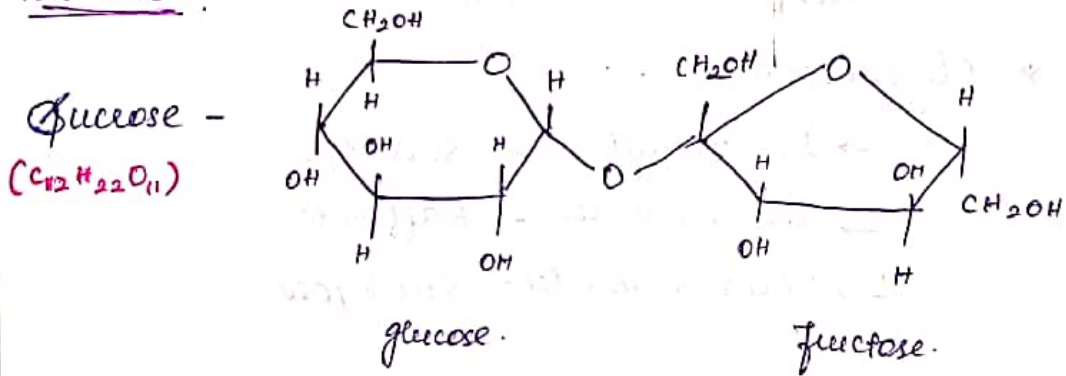
→ Heteropolysaccharides - Hyaluronic acid & heparin.

② Write the structure and functions of three biochemically important disaccharides.

- * Sucrose - glucose + fructose.
- * Maltose - glucose + glucose.
- * Lactose - glucose + galactose.

<u>Functions.</u>		
<u>Sucrose</u>	<u>Maltose</u>	<u>Lactose</u>
* used in syrup preparation, tablet manufacture, nutrient & demulcent.	* An important intermediate in the digestion of starch.	* Exclusive carbohydrate source to breast fed infant

Structure.



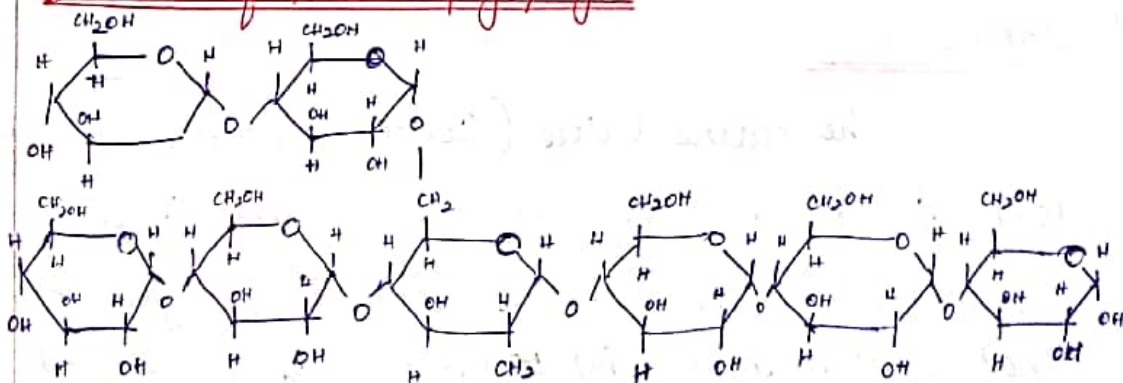
4) Give an example for disaccharides.

- * Maltose.
- * Lactose.
- * sucrose.
- * Trehalose.

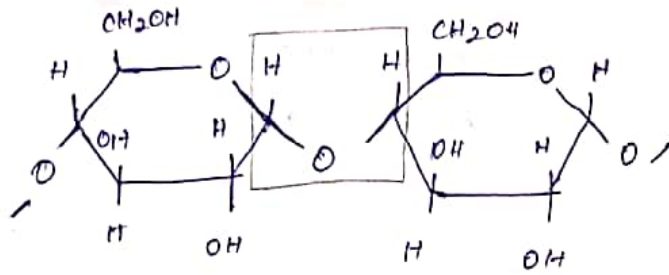
5) Difference between Reducing sugar & non reducing sugar.

Reducing sugar	Non reducing sugar.
<ul style="list-style-type: none"> * <u>free</u> aldehyde (-CHO) (or) ketonic (C=O) group. * <u>Good</u> reducing agents. * Includes all <u>monosaccharides</u> & some <u>disaccharides</u> * Give a <u>positive</u> reaction towards the Fehling's test. eg: Maltose, Lactose. 	<ul style="list-style-type: none"> * <u>Do not</u> have such groups. * <u>NOT</u> reducing agents. * Include some <u>disaccharides</u> & all <u>polysaccharides</u>. * Give a <u>Negative</u> reaction toward the Fehling's test. eg: starch.

6) Structure of starch & glycogen.



GLYCOGEN.



SIMPLE STARCH

⑦ Saponification Number.

The saponification number is the number of milligrams of potassium hydroxide required to neutralize the fatty acids resulting from the complete hydrolysis of 1g of fat.

eg: Human fat : 195-200
coconut oil : 250-260

⑧ Lipoproteins (Transport system).

Lipoproteins = Lipid + protein

Lipoprotein particle is to transport fat molecules, such as triglycerols, phospholipids & cholesterol within the extracellular water of the body to all the cells & tissue of the body.

⑨ Iodine value.

The iodine value (Iodine adsorption value (or) Iodine number (or) Iodine index) in Chemistry is the mass of Iodine in grams that is consumed by 100 grams of a chemical

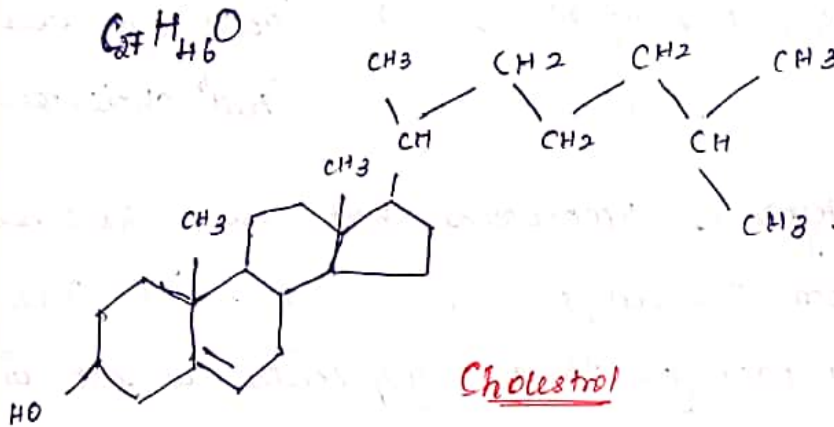
Substance. Iodine number are often used to determine the amount of unsaturation in fatty acids. eg: Coconut oil \rightarrow 7-10 (Iodine number).

10. Structure & function of cholesterol:

Function

Cholesterol is important in the membrane as it helps to maintain cell membrane as it helps to maintain cell membrane stability at varying temperature. It serves as a precursor for steroid hormones, bile acids & vitamin D.

Structure



11. Define Lipids

Lipids may be regarded as organic substances relatively insoluble in water, soluble in organic solvents (alcohol, ether etc.), actually (or) potentially related to fatty acids & utilized by the living cells.

Classification

- \rightarrow simple lipids
- \rightarrow compound lipids
- \rightarrow Derived lipids.

12. Phospholipids

These are complex (or) compound lipids containing phosphoric acid, in addition to fatty acids, nitrogenous base & alcohol.

Classification

- Glycerophospholipids (glycerol as the alcohol).
- Sphingophospholipids (Sphingosine as the alcohol).

13. What is good cholesterol and bad cholesterol?

- * HDL (High density lipoprotein) - "good" cholesterol.
- * LDL (Low density lipoprotein) - "bad" cholesterol.

are two types of lipoproteins that carry cholesterol to & from the body's cells in the blood. The liver then packages these triglycerides as fat in adipose tissue, & turns some of it into cholesterol.

14. Lecithins (Phosphatidylcholine)

Lecithins are the most abundant group of phospholipids in the cell membranes. Chemically, Lecithin (Greek: lecithos - egg yolk) is a phosphatidic acid with choline as the base.

Phosphatidylcholines represent the storage form of body's choline

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Essential fatty acids:

* The fatty acids that cannot be synthesized by the body and, therefore, should be supplied in diet are known as ESSENTIAL FATTY ACIDS.

* Only two fatty acids are known to be essential for humans

→ α -linolenic acid (an omega-3 fatty acid).

→ linoleic acid (an omega-6 fatty acid).

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Enthalpy:

↳ Heat (H)

Amount of heat energy transferred (heat absorbed (or) emitted) in a chemical process undergo constant temperature.

$\Delta H \rightarrow -ve \rightarrow$ Released Heat (Exothermic)

$\Delta H \rightarrow +ve \rightarrow$ Absorbs heat (Endothermic).

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Entropy.

↳ Order of Reaction (S)

→ Quantitative expression of the degree of disorder of the system.

→ Entropy measures the amount of heat dispersed (or) transferred during a chemical process.

$\Delta S \rightarrow -ve$ (\downarrow disorder)

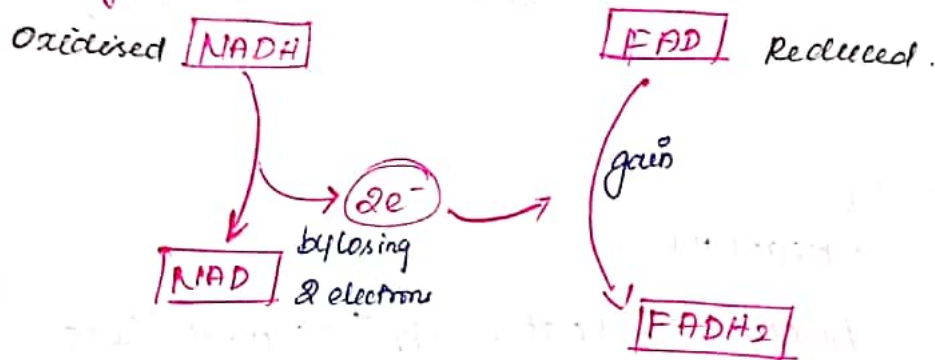
$\Delta S \rightarrow +ve$ (\uparrow disorder)

Maximum value of $\Delta S \rightarrow$ occurs at the equilibrium.

18) Redox potential.

(Reduction/oxidation potential) is a measure of tendency of a chemical species to acquire electrons from or lose electrons to an electrode and thereby be reduced or oxidised respectively.

Eg:



19) Name any two Reduction potential.

* Zinc has a reduction potential $-0.76V$,
Meaning it loses electrons & becomes oxidised.

* Copper has a reduction potential of $0.34V$,
Meaning it accepts electron & become reduced.

20) Mutarotation.

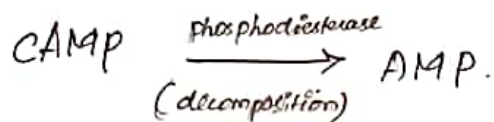
Mutarotation is defined as the change in the specific optical rotation representing the interconversion of α and β forms of D-glucose to an equilibrium mixture.

(21)

CAMP

(Cyclic Adenosine Monophosphate).

- * CAMP derived from ATP
- * CAMP used for Intracellular signal transduction.



Junctions

- * CAMP \rightarrow 2nd Messenger
 \downarrow
 - Transfer the effect of hormones such as glucagon & adrenaline.

- * CAMP + Kinase

\downarrow
Regulation of glycogen, sugar, lipid.

(22)

ATP

(Adenosine Tri phosphate) $[-7.3 \text{ cal/mol}]$

- "Molecular unit of currency"
- It contains three phosphate group.

Junctions

- Transport Organic substances Na, K, C through the cell membrane.

- Synthesizing chemical compounds such as proteins, cholesterol.

- Supply energy for mechanical work → Muscle contraction.

23. What is hydrolysis of starch?

The enzymes that break down (or) hydrolyze starch into the constituent sugars are known as amylases. Alpha-amylases are found in plants & in animals. Human saliva is rich in amylase, & the pancreas also secretes the enzyme.