UNIT -5
SURFACE CHEMISTRY

A. Short answer questions carrying 1 mark

1. **What is adsorption**

   A surface phenomenon wherein there is accumulation of molecules on the surface (than in the bulk) of a solid or a liquid.

2. **Why solids in finely divided state are good adsorbent?**

   Solids in finely divided state have large surface area, as surface area increases adsorbing power increases.

3. **What is desorption?**

   The process of removing an adsorbed substance from a surface on which it is adsorbed is called desorption.

4. **Name the substance used to decolour the solution of raw sugar.**

   Animal charcoal.

5. **Name of the phenomenon in which both the adsorption and desorption takes place simultaneously.**

   Sorption

6. **Why is adsorption always exothermic?**

   During adsorption there is always decrease in residual forces on the surface, hence adsorption is always exothermic.

   Or

   There is decrease in surface energy which appears as heat, hence adsorption is always exothermic.

7. **Name catalyst used in the conversion of alcohols into gasoline (petrol)**

   Zeolite ZSM-5 (Zeolite Sieve of molecular porosity-5)

8. **Name the colloidal system in which dispersed phase is solid and dispersion medium is liquid**

   Sol

9. **Name the dispersed phase in gel**

   Liquid

10. **Give an example for oil in water emulsion**

    Milk, Vanishing cream

11. What type of colloidal emulsion is present in butter

Water in oil (W/O)

12. What is the dispersion medium in gel?

Solid

13. Between Na_2SO_4 and Na_3PO_4 which has greater power to coagulate a positively charged colloid?

Na_3PO_4

14. Alum is added to muddy drinking water. Why?

Alum is added to muddy drinking water to coagulate

15. What is the dispersed phase in milk?

Oil or liquid

16. A liquid is dispersed in a gas. Name the type of colloid obtained.

Liquid aerosal

17. Name the instrument designed by Zigmondy.

Ultramicroscope

18. Movement of the dispersion medium in an electric field by preventing the movement of colloidal particles by suitable method.Name the phenomenon

Electroosmosis

19. The process by which colloidal particles aggregate, become bigger and settle down. Name the phenomenon

Coagulation

20. **What happens when an electrolyte is added to lyophobic sol?**
Coagulation or precipitation

21. Name the phenomenon, when an electrolyte having a common ion is added to freshly prepared precipitate?
Peptization

B. **Answer questions carrying 2 marks**

ADSORPTION

1. **What are adsorbate and adsorbent? Give an example.**

Molecules (substances) that accumulates on the surface is called **adsorbate.**
The material on the surface of which adsorption takes place is called **adsorbent.**

Example: Ni adsorbs H_2. Ni is the adsorbate, H_2 is the adsorbent

2. **Give two examples for adsorption**.

i) When animal charcoal is added to methylene blue, charcoal adsorbs the dye.

ii) Air becomes dry in the presence of silica gel because silica gel adsorbs water molecules on the surface

iii) A small pillow of silica gel in a box adsorbs moisture in the box keeps the air dry. (Any two)

3. **Give differences between adsorption and absorption.**

Adsorption	**Absorption**
1. A substance gets concentrated on the surface of a solid or liquid.	A substance gets uniformly distributed through the bulk of solid or liquid.
2. It increases with increase in surface area.	It remains unaffected by increase in surface area.
Example: adsorption of water by silica gel.	Example: Absorption of water by anhydrous $CaCl_2$.

4. Of SO_2 (critical temperature 630K) and CH_4 (critical temperature 190K) which gas will be adsorbed readily on the surface of 1 gram of activated charcoal. Justify the answer.

SO_2 gas

Easily liquefiable gases with higher critical temperature are readily adsorbed as the theVander Waal's forces are stronger near critical temperature.

5. What is the effect of temperature on physical and chemical adsorption?

Physical adsorption decreases with increase in temperature. Chemical adsorption increases with increase intemperature.

6. **Mention any two applications of adsorption.**

i) In the production of high vaccum

ii) In gas mask, to adsorb poisonous gases

iii) In the separation of noble gases using activated charcoal

iv) Removal of colouring matter from solutions

v) In adsorption chromatography to analyse a given

CATALYSIS

1. What is catalysis? Give an example.

A substance that accelerates the rate of a reaction without itself remaining unchanged chemically and quantitatively is a catalyst. The phenomenon is catalysis.

E.g.: $2KClO_3 \xrightarrow{MnO_2} 2KCl + 3O_2$

MnO_2 is a catalyst.

2. What are promoters and poisons with respect to a catalytic process?

Promoters are substance that increases the activity of a catalyst. E.g.: In Haber's process molybdenum acts as a promoter for iron used as a catalyst. A catalytic poison is one that decreases the efficiency or activity of a catalyst. E.g.: In Haber's process CO if present in the mixture of H_2 and N_2, poisons the iron catalyst.

3. What is homogeneous catalysis? Give an example.

When reactants and catalyst are in the same phase the process is homogeneous catalysis. E.g.:

a) $2SO_{2(g)} + O_{2(g)} \xrightarrow{NO_{(g)}} 2SO_{3(g)}$
Here the reactants (SO_2 and O_2) and catalyst (NO) are all gases.

b) Acid hydrolysis of cane sugar is also an example for homogeneous catalysis. Here the reactants sugar solution, water and the catalyst dil. HCl are in the same phase (aqueous solution)

$C_{12}H_{22}O_{11(aq)} + H_2O_{(l)} \xrightarrow{H^+} C_6H_{12}O_6 + C_6H_{12}O_6$ (both are in aq solution)
Sucrose glucose fructose

4. What is heterogenous catalysis? Give an example.

A catalytic process in which reactants and catalyst are in different phases are known as heterogenous catalysis.

E.g.: 1. $N_{2(g)} + 3H_{2(g)} \xrightarrow{Fe_{(s)}} 2NH_3$
Here the reactants are gases, catalyst iron is a solid

2. Vegetable oil $_{(l)} + H_{2(g)} \xrightarrow{Ni_{(s)}}$ Vanaspathi ghee
Here reactants and catalyst are in different phases.

5. Write a note on

a) activity b) selectivity of solid catalysts.

a) **Activity**: The activity (efficiency) of a solid catalyst depends on how strongly the reactants are chemisorbed on it. It is found that elements (metals) in group 7-9 of the periodic table show greater catalytic activity for hydrogenation reactions.

E.g.: $2H_{2(g)} + O_{2(g)} \xrightarrow{Pt} 2H_2O_{(l)}$

b) **Selectivity**: For a given set of reactants, different catalyst may yield different products. This is selectivity of a catalyst.

E.g.: $CO_{(g)} + 3H_{2(g)} \xrightarrow{Ni} CH_{4(g)} + H_2O_{(g)}$

$CO_{(g)} + H_{2(g)} \xrightarrow{Cu} H{-}CHO$

Ni is selective to convert water gas to CH_4 whereas Cu converts water gas into formaldehyde. In otherwords Ni catalyses the conversion of water gas to CH_4 but cannot catalyse to convert water gas to formaldehyde.

Catalyst is highly selective in nature i.e a given substance can act as a catalyst only in a particular reaction and not for all the reactions.

6. What is shape selective catalysis? Give an example.

A catalytic reaction that depends on pore structure of the catalyst and size of the reactant and product molecules is called ***shape selective catalysis***. E.g.: zeolites.

7. Write a note on zeolites as shape selective catalysts.

Zeolites are aluminosilicates with 3D nework of Al-O-Si frame with honey comb like structure. This structure makes them to act as shape selective catalyst depending on pore size in them and on the size of reactant and products. Many zeolites are synthesized for selective catalytic activity.

E.g.: 1) Zeolite ZSM-5 (Zeolite Sieve of molecular porosity- 5) converts alcohols into gasoline (petrol) by dehydrating alcohols.

2) Many zeolites are used in petroleum industry in cracking of hydrocarbons and in isomerisation.

8. What are enzyme catalysis or biochemical catalysis? Give an example for enzyme catalysis.

Enzymes are proteins, which catalyse large number of reactions that maintain life processes in both plants and animals. Hence they are biochemical catalysts and the phenomenon is called as biochemical catalysis.

Inversion of cane sugar in the presence of enzyme invertase into glucose and fructose

9. **Give two examples for enzyme-catalysed reaction.**

a) Conversion of starch into maltose

$2(C_6H_{10}O_5)_{n\,(aq)} + nH_2O_{\,(l)} \xrightarrow[\text{diastase enzyme}]{} nC_{12}H_{22}O_{11\,(aq)}$

Starch maltose

b) Urea into ammonia and carbon dioxide

$NH_2CONH_{2(aq)} + H_2O_{\,(l)} \xrightarrow{\text{urease}} 2NH_{3(g)} + CO_{2(g)}$

c) In human beings enzyme pepsin converts proteins into peptides and pancreatic trypsin enzyme converts proteins into amino acids.

d) Milk is converted into curds by lactobacilli enzyme present in the curd which is added to milk.

10. Mention characteristics of enzyme catalysis.

a) Their efficiency as catalyst is very high.
b) They are highly specific in their action.
c) They are highly active at optimum temperature and optimum pH.
d) Their activity increases in presence of activatiors and coenzyme.
e) Their activity decreases in presence of inhibitors and poisons.

11. Write the two steps involved in mechanism of enzyme catalysis.

a) An enzyme binds to the substrate to form an activated complex: $E + S \longrightarrow ES^*$
b) Decomposition of activated complex to form the product: $ES^* \longrightarrow E + P$.

COLLOIDS

1. What is a colloid?

Colloid (Colloidal system or solution) is a heterogeneous system in which one substance is dispersed as very fine particle in another substance called dispersion medium. The size of the particle is larger than the true solution but smaller than the suspended particle i.e their diameter ranges between 1nm to 1000nm.

2. Name the 2 phases of colloidal system

Dispersion medium and dispersed phase (colloidal particles)

3. What is Dispersion Medium and dispersed phase for a colloid? Give an example.

The continuous medium in which the colloidal particles are dispersed is called **Dispersion Medium**.
The discontinuous phase which the substance is dispersed as colloidal particles is called **dispersed phase.**
Eg: Milk is a colloid in which fat globules form the dispersed phase, water is the dispersion medium.

4.**Classify the colloids based on the physical state**

Based on the physical state of dispersed phase and dispersion medium colloids are classified into 8 types

Dispersed Phase	**Dispersion Medium**	**Name of the Type**	**Example**
solid	solid	Solid sol	Ruby glass, gems
solid	liquid	sol	Ink, Paint, Gold Sol
solid	gas	Solid aerosol	Dust, Smoke, Soot in Air,
liquid	solid	gel	curds, jam, silica gel, butter

liquid	liquid	emulsion	Milk, Cream, Cod Liver Oil
liquid	gas	Liquid aerosol	Fog, Mist, Cloud
gas	solid	Solid foam	Foam rubber, Pumice stone
gas	liquid	foam	Shaving cream, soap lather

5. **What is a Sol? Give an example.**

It is a colloid wherein the dispersed phase is a solid and dispersion medium is a liquid. Eg: Sulphur dispersed in Water. Sulphur (solid) is the dispersed phase, water is the dispersion medium.

If the dispersion medium is water, alcohol and benzene, sol is called aqua sol (hydrosol), alcosol and benzosol.

6**. How are colloids classified based on the affinity of the dispersed phase towards dispersion medium**

Based on the affinity of dispersed phase towards dispersion medium, sols are classified as lyophilic and lyophobic sols (colloids).

7. **What is lyophylic sol? Give an example**

Lyophilic sol (colloid): These are sols in which the (colloidal particle) dispersed phase has affinity towards dispersion medium. (Intrinsic colloids). If the dispersion medium is separated from the dispersed phase, these sols can be formed by remixing them. Hence these are called reversible sols.

Eg: Starch dispersed in water
Albumin dispersed in water
Gum or gelatin in suitable solvent.

8. **What is lyophobic sol? Give an example**

Lyophobic sol (colloid): These are sols in which the dispersed phase has no affinity towards the dispersion medium (extrinsic colloids). Once precipitated or if the dispersion medium is separated from the dispersed phase, these sols cannot be formed by remixing them. Hence these are called irreversible sols.

Eg: Sulphur dispersed in water, gold sol.

9.Distinguish between lyophillic to lyophobic sols (Any two)

	Property	**Lyophilic**	**Lyophobic**
1	Affinity towards dispersion medium	High affinity	Low affinity
2	Method of preparation	Easily formed on mixing or heating the dispersed phase with dispersion medium	Special methods are used

3	Stability	stable	Highly unstable
4	Reversibility	Reversible	Irreversible
5	Solvation of colloidal particles.	Highly Solvated	Not solvated
6	Addition of electrolyte	Does not easily coagulate	Gets easily coagulated

10.Classify the colloids based on type of particles of the dispersed phase

Multimolecular colloid, Macromolecular colloid, associated colloid (micelles)

11.Write a note on Multimolecular colloids with an example

If large number of atoms or smaller molecules of a substance aggregate together to form particles having size in the colloidal range then the colloidal system is known as multimolecular colloid. E.g.: A gold sol contains colloidal gold particles each made up of large number of gold atoms. Sulphur sol contains an aggregate of thousands of S_8 sulphur molecules.

12.Write a note on Macromolecular colloids with an example

Macromolecule (polymers) in a suitable solvent form solutions in which the size of the macromolecules may be in the colloidal range and the system is known as macromolecular colloids. E.g.: starch, cellulose, enzymes, proteins, nylon, polystyrene in a suitable solvent.

13. Write a note on Associated colloids /micelles with an example

Some substances at low concentration behave as strong electrolytes (true solution), but at higher concentrations aggregate to form colloidal particles. Such substances form associated colloid. Aggregate of molecules thus formed is called a micelle. Formation of micelle takes place if i) the temperature is above Kraft temperature (T_K) ii) concentration is greater than critical micelle concentration (CMC).

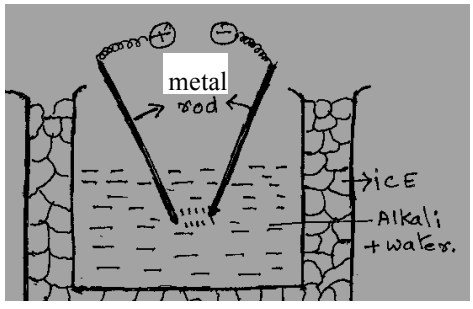
If an associated colloid (micelle) is diluted, it behaves as a strong electrolyte. E.g.: Surface active agents like soaps and detergents form associated colloids. These have both lyophilic and lyophobic groups. For soaps, critical micelle concentration is 10^{-4} to 10^{-3} mol

14. Write equations for the preparation of Sulphur sol and Ferric hydroxide sol

I. $SO_2 + 2H_2S \xrightarrow{\text{oxidation}} 3S_{(sol)} + 2H_2O$

2. $FeCl_3 + 3H_2O \xrightarrow{\text{hydrolysis}} Fe(OH)_{3(sol)} + 3HCl$

15. **How is a metal sol prepared by Bredig's arc process?**



This process involves both dispersion and condensation. Sol of metals like gold, platinum and silver can be prepared by this method. Two

electrodes of a metal are dipped in water and an electric arc is struck between them. Intense heat of the arc causes the metal to vapourise.The vapours condenses to form metal particles of colloidal size. Thus metal sol is obtained.

16. What is peptization? Give an example

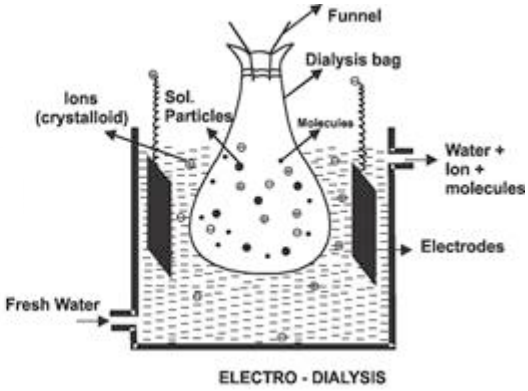
The process of converting a freshly prepared precipitate (suspension) into a colloid by adding a electrolyte having a common ion is called peptization.

The electrolyte added is called a peptizing agent.

During peptisation, the precipitate adsorbs one of the ions (positive or negative) of the electrolyte. This causes the precipitates to break into smaller particles of colloidal size.

17. What is electro dialysis?

The process of increasing the rate of dialysis, under the influence of an electric field is called **electro dialysis**. The process can be used iff the impurity is an electrolyte. In presence of the electric field, the ions diffuse faster (through parchment paper) towards the oppositely charged electrodes.



ELECTRO - DIALYSIS

18. Write a note on ultrafiltration

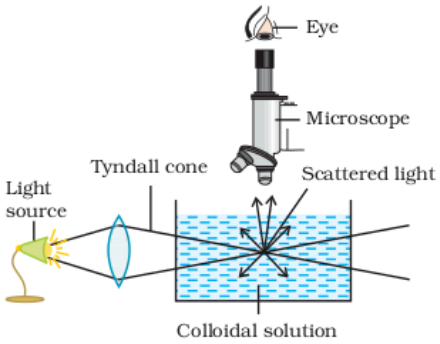
It is a process of separating collidal particles from the solvent (dispersion medium) and all other soluble solutes present in collidal solution using specially prepared ultrafilters.

An ultra filter paper (made by soaking filter paper in 4% nitro cellulose in alcohol and ether and later hardening it by using formaldehyde) allows all other particles except the colloidal particles to filter (pass) through it.

To speed it up pressure or suction can be applied. The colloidal particles left on the ultrafilter paper are then stirred into fresh dispersion medium to get the pure colloidal solution.

19. Describe Tyndall effect

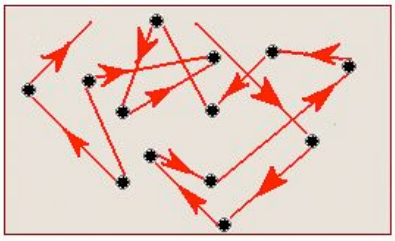
Scattering of light by colloidal particles in the medium is called Tyndall effect. The path of light in the colloidal medium becomes visible when observed at right angles. The illuminated path within the medium is called Tyndall cone.



20. Write two conditions in which tyndal effect can be clearly observed.

Tyndall effect is clearly observed when a) size of colloidal particles matches with the wave length of light used b) there is large difference in refractive index between dispersed phase and medium

21. What is Brownian movement? How is it caused?



Zig– Zag movement of colloidal particles in a medium is called Brownian movement.

Reason: Particles of the medium are very small and are moving randomly in all directions. They collide with the colloidal particles and transfer their kinetic energy. Colloidal particles move slowly and randomly due to unequal bombardments by the particles of the medium. This is seen as "Brownian Movement". "This property is a direct proof for the concept that liquid state of matter is made up of small molecules, which are in random motion, does not allow the particles to settle and is responsible for the stability of the sols"

22. Classify the following colloids into positively and negatively charged sols

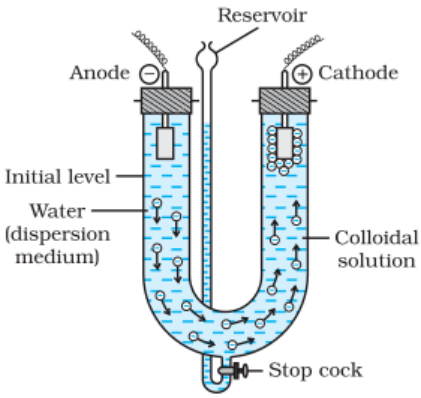
Al $(OH)_3$, CdS, AS_2S_3, Fe $(OH)_3$, gum, clay, basic dyes, Sols of acidic dyes, sols of starch, and metallic sulphides, sols of metals (Ag, Au), haemoglobin.

Positively charged sol	**negatively charged sol**
Al $(OH)_3$, Fe $(OH)_3$, basic dyes, haemoglobin,	CdS, AS_2S_3, Sols of acidic dyes, sols of starch, gum, clay, and metallic sulphides and sols of metals (Ag, Au)

23. How do colloidal particle become charged or acquire charge?

The charge on the colloidal particles may be due to (i) preferential adsorption of ions from the medium or (ii) due to electron capture by sol particles during electrodispersion of metals.(iii)formation of electrical double layer

24.What is Electrophoresis.



Movement of electrically charged colloidal particles towards their oppositely charged electrodes when the colloid is placed in an electric field is **electrophoresis**. Positively charged particles move towards cathode and negatively charged particles move towards anode.

25. Mention any two methods of Coagulation of lyophobic sol

i) Electrophoresis

ii) Mixing of two oppositely charged sols. E.g.: positively charged $Fe(OH)_3$ sol with negatively charged As_2S_3 sol

iii) Continuous dialysis

iv) Addition of electrolyte

v) By boiling

26. State and illustrate Hardy- Schulze rule.

Higher the valency of the flocculating ion added, greater is the coagulating power of the ion.

Ex (1): In the coagulation of negatively charged sol (As_2S_3) the coagulation power of the positively charged active ion is $Na^{+} < Ba^{+2} < Al^{+3}$.

Ex (2): In the coagulation of positively charged sol [$Fe(OH)_3$] the coagulating power of the negatively charged active ion is $Cl^{-} < SO_4^{-2} < PO_4^{-3} < [Fe(CN)_6]^{4-}$.

Note: Higher the charge on the flocculating ion, lesser is the amount of the electrolyte required to coagulate a sol.

27. Difine coagulating value or flocculating value

The minimum concentration of electrolyte in **millimoles per litre** required to cause precipitation of a sol in **2 hours** is called coagulating value. Smaller the coagulating value, higher is the coagulating power of the ion.

28. What is protective action of a sol? Give an example.

The property of a lyophilic sol by which it protects the lyophobic sol from precipitation, even upon adding an electrolyte to it, is called protective action of lyophilic sol. Lyophilic sol particles form a coat or layer around the lyophobic sol and hence protect them from the action of the electrolytes.

29. What are Emulsions? Give an example

A liquid in a liquid colloid is called an emulsion. If two immiscible liquids are shaken well, a dispersion of one liquid in the other, an emulsion is obtained.

Eg: Milk, butter, vanishing cream

30.Write a note on formation of delta region.

River water flowing towards the sea picks up many colloidal particles (clay, mud, humus, slit) with it. These particles are negatively charged. When the river water meets the sea, the electrolytes (salts like NaCl, $MgSO_4$ etc) in the sea causes the coagulation of these colloidal particles. Thus clay, mud, humus gets precipitated and scattered at these places to form delta region.

31.Write the application of colloids in purification of smoke using Cottrell precipitator

Smoke (Colloidal dispersion of solid in gas) from industries contains carbon, dust, soot and many others as colloidal particles. To remove these, electrostatic precipitator called cottrell precipitator is used. The precipitator consists of metal plates attached to a high potential. As the smoke enters the precipitator, the charged colloidal particles

gets neutralized and precipitated on the metal plates. Gases free from colloidal impurities are led into chimney.

32. Write the application of colloids in the Purification of drinking water

Drinking water if muddy contains negatively charged clay, sand, mud as colloidal particles dispersed in it. When alum is added to this, Al^{+3} ions of the alum causes the coagulation of the negatively charged muddy colloidal particles which settle down as a precipitate. The upper layers of clear clean water are decanted. Thus water gets purified.

C. Questions carrying 3 marks

1. What happens to ΔH, ΔS and ΔG during the process of adsorption?

i) Adsorption is always an exothermic process, because there is decrease in surface energy. ∴ ΔH is negative (enthalpy decreases).

ii) When a gas is adsorbed on a liquid or solid, freedom of movement of gas molecules decreases. ∴ entropy decreases. ΔS is negative.

iii) Adsorption is a spontaneous process hence ΔG must be negative. $\Delta G = \Delta H - T\Delta S$. For adsorption ΔH = negative, ΔS = negative. Therefore ΔH must be more negative than TΔS being positive so that ΔG becomes negative.

2.Write any three differences between two types of adsorption of gases on solids.

Physiosorption (physical adsorption)	Chemisorption (chemical adsorption)
1. Accumulation of gas on a solid due to weak van der Waal's forces.	1. Accumulation of gas on a solid due to chemical bond (covalent or ionic)
2. This is not specific, as force between adsorbate and adsorbent is van der Waals forces which is universal.	2. It is highly specific as there is chemical bonding between adsorbate and adsorbent.
3. The process is reversible.	3. Process is irreversible.
4. Gases that can be easily liquefied (high critical temperature) are readily absorbed.	4. Gases that can form chemical compounds with adsorbent are specifically adsorbed.
5. Enthalpy of adsorption is low, as the forces involved are weak (ΔH is negative but low)	5. Enthalpy of adsorption is high, as the forces involved are strong (ΔH is negative, very high)
6. Adsorption decreases with increase in temperature. Low temperature favours better adsorption.	6. Adsorption process involves high energy of activation, therefore increases with increase in temperature.
7. Under high pressure, it leads to multimolecular layers of adsorption.	7. It leads to unimolecular layer of adsorption even at high pressure.

(Any 3 of the above)

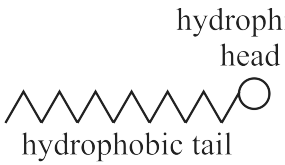
3. Classify the following colloids to their respective type of colloids

a. Smoke **b. Cod liver oil** **c. gems.**

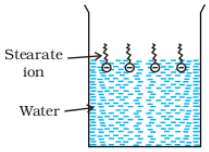
a. Smoke-Solid aerosal b. Cod liver oil-Emulsion c. gems-solid sol

4.Write the mechanism of micelle formation considering soap as an example

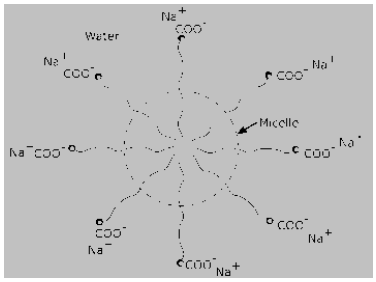
Soap is sodium or potassium salt of higher fatty acid $RCOO^-Na^+$.



In water $RCOO^-Na^+$ dissociates into $RCOO^-$ and Na^+. $RCOO^-$ has two parts. R is long hydrocarbon chain and is a non-polar tail (hydrophobic). COO^- is polar-ionic head (hydrophilic).



At low concentration COO^- group will be dissolved in water and R chains away from water and remain at the surface.



At critical micelle concentration, the anions are pulled into the water. They aggregate to form spherical shape in which hydrocarbon chains point to the interior and COO^- projects outwards of the sphere. Such an aggregate is called a micelle.

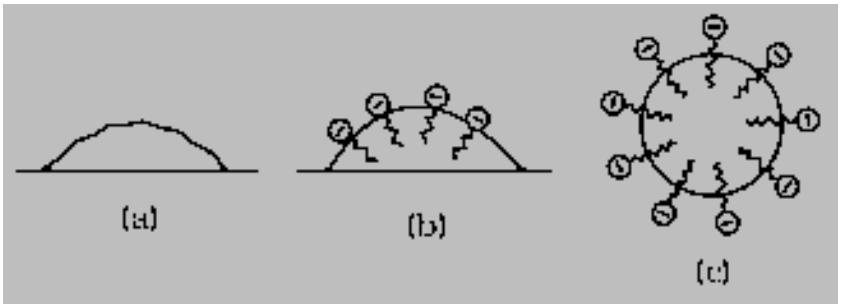
5. Write a note on Cleansing action of soap

a. It is due to formation of micelle by soap.

b. Soap molecules form a micelle around oil droplet (dirt) in such a way that hydrophobic R is in the oil and hydrophilic $-COO^-$ projects out into water.

c. The oil droplet thus gets pulled into water and gets detached from dirty cloth (material to be washed).

d. Soap thus helps in emulsification of oil and fat in the dirt, which is then washed away with water.



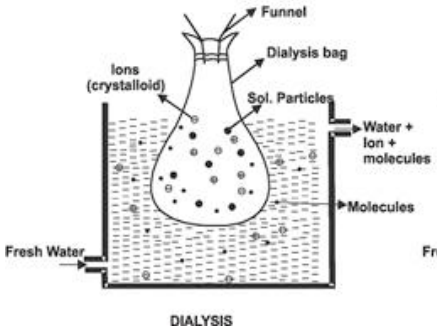
a) Grease on cloth

b) Stearate ions arranging around the grease droplet and

c) grease droplet surrounded by stearate ions (micelle formed)

6. Write a note on Dialysis.

A process of purifying a lyophobic sol by removing particles of true solution (ions or molecules) by their preferential diffusion through parchment paper or animal membrane is called **Dialysis**. The membrane is called a dialyser. Particles of true solution pass through the membrane but not the colloidal particles.



Process: The sol to be purified is taken in a parchment bag. The bag is suspended in a tank, in which water is circulated. Particles of true solution diffuse out from the bag. Water flowing in the tank carries away these particles. The sol gets purified and stabilized.

7. Describe how colloidal particles acquire charge by preferential adsorption of ions

The colloidal particle in a lyophobic sol tends to adsorb cations or anions from the medium and hence become positively or negatively charged sols. They show a preference to adsorb a common ion from the medium.

Ex: (a) when potassium iodide solution is slowly added to silver nitrate solution, the silver iodide sol formed adsorbs Ag^{+1}(present in plenty) and becomes positively charged. (AgI/ Ag^{+1})

Ex: (b) When silver nitrate solution is slowly added to potassium iodide solution, silver iodide sol formed adsorbs I^{-1} (present in plenty)ions from the medium and becomes negatively charged sol (AgI / I^{-1}).

8. Mention two types of emulsion. Give example for each

i) Oil in water or ii) water in oil emulsion.

For oil in water emulsion, water is the dispersion medium, oil the dispersed phase. E.g.: milk, vanishing cream. In milk, liquid fat is dispersed in water.

For water in oil emulsion, water is the dispersed phase, oil is the dispersion medium. E.g.: butter, cream.