	INDIAN SCHOOL AL WADI AL KABIR	
Class: XII	**Department: SCIENCE 2021 - 22** **SUBJECT : CHEMISTRY**	**Date of submission:** **27.02.2022**
Worksheet No:11 **with answers**	**Topic:** **CHAPTER 5 – SURFACE CHEMISTRY**	**Note:** **A4 FILE FORMAT**
NAME OF THE STUDENT	**CLASS & SEC:**	**ROLL NO.**

PREVIOUS YEARS' BOARD BASED QUESTIONS WITH ANSWERS

Q.NO.	Questions with Answers
1	What are lyophilic and lyophobic sols? Give one example of each type. Which one of these two types of sols is easily coagulated and why? **Answer** **The colloidal systems in which the particles of the dispersed phase have a strong affinity for the dispersion medium are called lyophilic sols. For example, gum, protein, starch.** **On the other hand if dispersed phase tends to repel (i.e., dislike or hatred) dispersion medium, the resultant sol is termed as lyophobic sol.** **Lyophobic sols are less stable since their stability is due to charge only.**
2	Explain what is observed when: (*i*) an electrolyte, KCl, is added to a hydrated ferric oxide sol. (*ii*) an electric current is passed through a colloidal solution. (*iii*) a beam of strong light is passed through a colloidal solution. **Answer:** **(i) When and electrolyte like KCl is added to a hydrated ferric oxide sol, the positively charged colloidal particles get coagulated by the oppositely**

		charged chloride ions provided by KCl. **(ii) On passing the electric current, colloidal particles move towards the oppositely charged electrode where they lose charged and get coagulated.** **(iii) When a beam of strong lights is passed through a colloidal solution scattering of ligth by colloidal particles take place and the path of light becomes visible. This phenomenon is called Tyndall effect**
3		Mention two ways by which lyophilic colloids can be coagulated. **Answer:** **This can be done (i) by adding an electrolyte. (ii) by adding a suitable solvent.**
4		Explain what is observed when an electrolyte NaCl, is added to hydrated ferric oxide sol. **Answer:** **An electrolyte, NaCl is added to hydrated ferric oxide sol. ... Particles of ferric oxide sol are positively charged. Thus, they get coagulated in the presence of negatively charged Cl⁻ ions**
5		Define the term 'Tyndall effect'.
6		How are the following colloids different from each other in respect of dispersion? medium and dispersed phase? Give one example of each type. (*i*) An aerosol (*ii*) A hydrosol (*iii*) An emulsion
7		What is the 'coagulation' process? **Answer:** **That process includes coagulation, a step in which chemicals are added that because small particles suspended in the water to clump together**
8		Define the following: (*i*) Peptization **Answer :** **Peptization is the process responsible for the formation of converting precipitate into colloid by shaking with it an electrolyte**

	(*ii*) Reversible sols	
	Answer:	
	Lyophilic Colloids (liquid loving)- **They are also called Reversible sols as in these sols (colloids) when the dispersion phase is separated from the dispersion medium (by say evaporation) , the sol can be formed again by just mixing the dispersion phase and medium again.**	
9	What is the difference between multimolecular and macromolecular colloids? Give one example of each type. How are associated colloids different from the above two types of colloids?	
10	Define 'electrophoresis.	
11	Explain how the phenomenon of adsorption finds application in each of the following processes: (*i*) Production of vacuum (*ii*) Heterogeneous catalysis (*iii*) Froth floatation process **Answer:** (i)Production of high vacuum: Traces of air can be adsorbed by charcoal from a vessel, evacuated by a vacuum pump to give a very high vacuum. (ii)Heterogeneous catalysis:The gaseous reactants are adsorbed on the surface of the solid catalysts. As a result, the concentration of the reactants increases on the surface and hence the rate of the reaction increases. (iii)Froth floatation process: This process is used to remove gangue from sulphide ores. The basic principle involved in this process is adsorption. In this process, a mixture of water pine oil is taken in tank. The impure powdered sulphide ore is dropped in through hopper and the compressed air is blown in through the agitator is rotator is rotated several times. As a result, froth is formed and the sulphide ores get adsorbed in the froth. The impurities settled down and are let out through an outlet at the bottom. The froth formed is collected in froth collector tank. After sometime, the ore particles in the froth collecting tank start settling gradually, which are then used for further metallurgical operations.	

12	. Define each of the following terms:
	
	    (*i*) Micelles
	
	    (*ii*) Peptization
	
	    (*iii*) Desorption
	
	Answer:
	
	(i)A micelle is an aggregate of surfactant molecules dispersed in a liquid. A micelle in aqueous solution forms as aggregate such that the hydrophilic "head" regions are in the centre of micelle.
	
	(ii)Peptization is the process of conversion of a precipitate into a colloidal sol by shaking it with the dispersion medium in the presence of an electrolyte. The electrolyte used in this reaction is known as a peptizing agent.
	
	(iii)Desorption is the process of removing an adsorbed substance from the surface through which it was adsorbed.

13	Classify colloids where the dispersion medium is water. State their characteristics and write an example of each of these classes.
14	What are lyophobic colloids? Give one example for them.
15	Write four distinguishing features operative between chemisorption and physisorption.
16	What is meant by coagulation of a colloidal solution? Describe briefly any three methods by which coagulation of lyophobic sols can be carried out? 20. Write three distinct features of chemisorption which are not found in physisorption.
17	Why is the adsorption phenomenon always exothermic? **Answer:** **When a gas is adsorbed on a solid surface, its movement is restricted leading to a decrease in the entropy of the gas i.e., ΔS is negative. Now for a process to be spontaneous, ΔG should be negative. Since ΔS is negative, ΔH has to be negative to make ΔG negative. Hence, adsorption is always exothermic.**
18	Write the dispersed phase and dispersion medium of the following colloidal systems: (*i*) Smoke (*ii*) Milk
19	What are lyophilic and lyophobic colloids? Which of these sols can be easily coagulated on the addition of small amounts of electrolytes?

20	Write the differences between physisorption and chemisorption with respect to the following:
	
	    (*i*) Specificity (ii) Temperature dependence
	    (*iii*) Reversibility and (*iv*) Enthalpy change

21	Of physisorption or chemisorption, which has a higher enthalpy of adsorption?
22	What is the difference between multimolecular and macromolecular colloids? Give one example of each.
23	What are the characteristics of the following colloid? Give two examples: Multimolecular colloids
24	Define the term giving an example of associated colloids. **Answer :** **Associated colloids are the colloids which act as electrolyte at low concentration and show colloidal behaviour at high concentration. Example: Soap solution.**
25	What happens when a freshly precipitated $Fe(OH)_3$ is shaken with water containing a small quantity of $FeCl_3$?
26	Why is a finely divided substance more effective as an adsorbent?
27	Write the dispersed phase and dispersion medium of the following colloids: (*i*) Cheese (*ii*) Fog Answer : **The dispersed phase and dispersion medium of fog respectively are liquid and gas. It is an example of liquid aerosol.** **The dispersed phase is liquid and dispersion medium is gel or solid emulsion in cheese**
28	*a*) In reference to Freundlich adsorption isotherm write the expression for adsorption of gases on solids in the form of an equation.

	(a) The freundich adscription isotherm is mathematically expressed as $\frac{x}{m} = Kp^{1/n}$ It is also written as $log\frac{x}{m} = logK + \frac{1}{n}log\,p$ or, $\frac{x}{m} = Kc^{1/n}$ It is also written as $log\frac{x}{m} = logK + \frac{1}{n}log\,c$ where, x = mass of adsorbate m = mass of adsorbent p = Equlibrium pressure of adsorbate c = Equilibrium concentration of adsorbate in solution K and n are constant for a given adsorbate and adsorbent at a particular temperature. At high pressure, 1/n = 0, hence, extent of adsorption becomes independent of pressure (*b*) Write an important characteristic of lyophilic sols (*c*) Based on type of particles of dispersed phase, give one example each of associated colloid and multimolecular colloid.
29	Give one example each of sol and gel. **Answer:** **Sol is a solid dispersed in a liquid. Examples include Au, As2S3, S in water, paints, milk of magnesia. Gel is a liquid dispersed in solid. Examples include cheese, butter, jellies**
30.	Give one example each of lyophobic sol and lyophilic sol.
31.	Give one difference between dialysis and electro-dialysis
32.	Write the difference between Electrophoresis and Electro-osmosis
33.	What are soaps? Explain the formation of ionic micelles.
34.	What is the effect of temperature on chemisorption?
35.	What are the dispersed phase and dispersion medium in milk?
36.	What type of forces are responsible for the occurrence of physisorption?

37.	a) Write the expression for the Freundlich adsorption isotherm for the adsorption of gases on solids, in the form of an equation. b) What are the dispersed phase and dispersion medium of butter? **Answer:** **Butter is a type of gel in which dispersion medium is Solid and dispersed phase is Liquid.** c) A delta is formed at the meeting place of sea and river water. Why? **Answer:** **River water is a negatively charged colloidal solution whereas sea water contains a number of electrolytes. At the meeting point of sea water and river water, the electrolytes present in sea water coagulate the colloidal solution of clay resulting in its deposition with the formation of delta.**
38.	Explain the following statement - The sky appears blue. **Answer:** **Scattering of light is the phenomenon that causes the sky to appear blue. Fine dust in the earth's atmosphere scatters the sunlight**
39.	Explain the following statement - Alum is used for blood clotting **Answer:** **Alum is used as both a disinfectant and in blood coagulation. The ions from alum neutralize the charges on plasma proteins, causing the plasma proteins to clump together. Overall, this process is referred to coagulation. As a disinfectant, alum neutralizes the ions on proteins on microbes, causing precipitation**
40.	Smoke precipitator is essential in factories. Explain **Answer:** **Smoke precipitators are used for air pollution control, particularly for removing particles from waste gases at industrial facilities and power-generating stations.**
41.	Give three points of difference between physisorption and chemisorption.
42.	Name the temperature above which the formation of micelles takes place.
43	What is CMC?

	Answer: **The formation of micelles takes place only above a particular temperature called Kraft temperature and above a particular concentration called critical micelle concentration (*CMC*)**
44	Based on the type of dispersed phase, what type of colloid is micelles?
45	Out of $BaCl_2$ and KCl, which one is more effective in causing coagulation of a negatively charged colloidal sol? Give reason.
46	Out of $AlCl_3$ and NaCl, which is more effective in causing coagulation of a negative sol and why?
47	What is the type of charge on AgI colloidal sol formed when $AgNO_3$ solution is added to KI solution?
48	Differentiate between the following: Solution and Colloid
49	Write the dispersed phase and dispersion medium of paints.
50	Write the dispersed phase and dispersion medium of smoke.
51	Define the following terms: Sorption **Answer :** **absorption and adsorption considered as a single process.**
52	Write a method by which lyophobic colloids can be coagulated.

53	Give reasons for the following observations:
	
	      (*i*) Physisorption decreases with increase in temperature
	
	      (*ii*) Addition of alum purifies the water.
	      (*iii*) Brownian movement provides stability to the colloidal solution.
	Answer:
	It is because the Brownian movement has stirring effect which does not permit the particles to settle and thus it is responsible for stability.
	The stability of the colloidal sols is due to the presence of charge on colloidal particles. The similarly charged particles mutually repel. Apart from these sol particles gat solvated and participate in Brownian motion.

54	Write the dispersed phase and dispersion medium of butter
55	Physisorption is reversible while chemisorption is irreversible. Why?

56	Give reasons for the following observations:
	(*i*) NH_3 gas adsorbs more readily than N_2 gas on the surface of charcoal.
	Answer:
	Higher the critical temperature of a gas, more readily it can get adsorbed on the surface of an adsorbent due to stronger van der Waal's forces at this temperature. ... Thus, NH_3 gas adsorbs more readily than N_2 gas on the surface of charcoal.
	(*ii*) Powdered substances are more effective absorbents.
57	Explain the steps involved in the mechanism of adsorption.
58	Hardening of leather in tanning industry is based on: [2020]
	a. Electrophoresis b. Electro-osmosis c. Mutual coagulation d. Tyndall effect
59	Explain the cleansing action of soap. [2020]
	Answer:
	The cleansing action of soap is due to the formation of micelle by the soap molecules in such a way that the hydrophobic part is in the oil droplet (dirt) and the hydrophilic part projects out. Since the polar groups interact with water surrounded by soap ions is pulled from the surface and pulled into water.

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