Blue Print (As per PU Board)

Topic	1 mark questions	2 marks questions	3 marks questions	5 marks questions	Total Marks
Surface Chemistry	1	–	–	1	6

One mark questions

1. **What is physical adsorption?**
   Answer: An adsorption in which adsorbate and adsorbent are held together by weak Vander Waals forces of attraction is called physical adsorption.
2. **What is heterogeneous catalysis?**
   Answer: A catalytic process where in reactants and catalyst are in different phases.
3. **As_2S_3 sol is negatively charged. Between sodium nitrate and aluminium nitrate which one is needed in large quantity to coagulate the above sol?**
   Answer: Sodium nitrate
4. **What is Brownian motion?**
   Answer: Zig-Zag or random motion of colloidal particles in the colloidal solution.

Two marks questions

5. **Give one example each for homogeneous and heterogeneous catalysis**
   Answer: Homogeneous catalysis

   $$2SO_{2(g)} + O_{2(g)} \underset{\rightleftharpoons}{\overset{NO_{(g)}}{\rightleftharpoons}} 2SO_{3(g)}$$ (1 mark)

   Heterogeneous catalysis

   $$2SO_{2(g)} + O_{2(g)} \xrightarrow[V_2O_5]{Pt_{(s)}\text{or}} 2SO_{3(g)}$$ (1 mark)
6. **Of NH_3 and N_2, which gas will be adsorbed more readily on the surface of charcoal and why?**
   Answer: NH_3 will adsorb more easily due to more surface area, hence more (1 mark)
   Vander Waal's forces of attraction and easily liquefiable as compared to N_2 (1 mark)
7. **What is flocculation or coagulation value?**
   Answer: It is defined as the number of millimoles of an electrolyte which must be added to one litre of the sol so as to bring about complete coagulation. (2 marks)
8. **What is meant by 'Emulsifiers and miscelle's?**
   Answer: **Emulsifiers:** The substance added to stabilize the emulsions are called emulsifiers. (1 mark)
   Miscelles: When small particles or ions of an electrolyte or soap molecules form the aggregate particles which behave like colloidal particles, they are known as miscelles. (1 mark)

Five marks questions

9. **(a) Write any two differences between physisorption and chemisorption** (2 marks)
   Answer:

	Physisorption		Chemisorption	
(i)	Adsorbate and adsorbent are held by weak Vander Waals forces of attraction	(i)	Adsorbate and adsorbent are held by strong chemical bonds	(1 mark)
(ii)	It is reversible in nature	(ii)	It is irreversible in nature	
(iii)	It is not specific	(iii)	It is highly specific	
(iv)	It is favoured at low temperature	(iv)	It is favoured at high temperature	(1 mark)
(v)	Multimolecular layer is formed	(v)	Unimolecular layer is formed	

(Any two)

(b) Name the phenomenon effect for the following

(i) Colloidal particles are in zig-zag motion

(ii) When an electrical potential is applied across 2 platinum electrodes dipping in a colloidal solution, particles more towards one or the other electrodes.

(iii) Scattering of light by colloidal sol (3 marks)

Answer: (i) Brownian movement (1 mark)

(ii) Electrophoresis (1 mark)

(iii) Tyndall effect (1 mark)

10. **(a) What is coagulation of a sol? Name two methods by which a lyophobic sol can be coagulated.** (3 marks)

Answer: The process of settling of colloidal particles is called coagulation of the sol. (1 mark)

A lyophobic sol can be coagulated

(i) by electrophoresis

(ii) by boiling

(iii) by adding an electrolyte (any two) (2 marks)

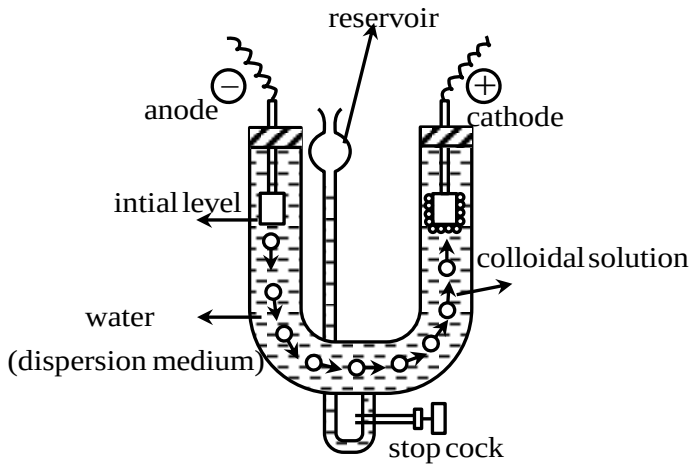
(iv) by mixing 2 oppositely charged sols

(b) What is the change in enthalpy and entropy during adsorption of gas on a solid?

Answer: Enthalpy decreases or ΔH is $-ve$ (1 mark)

Entropy decreases or ΔS is $-ve$ (1 mark)

11. **(a) Describe electrophoresis with the help of a diagram.** (3 marks)



(2 marks)

Answer: The movement of colloidal particles under an applied electric potential towards their oppositely charged electrode is known as electrophoresis and indicates that colloidal particles are charged. (1 mark)

(b) What is meant by shape selective catalysis? Give an example of shape selective catalysis. (2 marks)

Answer: The catalysis reaction that depends upon the pore structures of the catalyst and the size of the reactant and product molecules is called shape selective catalysis. (1 mark)

Ex: Zeolites $[GSM-5]$ (1 mark)

12. **(a) Mention any three methods of coagulation of lyophobic sols**

Answer: (i) By electrophoresis, the colloidal particular move towards the oppositely charged electrodes and coagulates. (1 mark)

(ii) By mixing 2 oppositely charged sols (1 mark)

(iii) By addition of electrolytes (1 mark)

(b) Give any two characteristic features of enzyme catalysts.

Answer: (i) Enzymes are highly specific in their action (1 mark)

(ii) Enzymes show maximum activity at a particular pH called optimum pH (1 mark)

(iii) Enzymes becomes inactive in the presence of electrolyte and uv radiations. (any two)