

QB365

Important Questions - Surface Chemistry

12th Standard CBSE

Chemistry

Reg.No. :

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Time : 01:00:00 Hrs

Total Marks : 50

Section - A

- 1) The correct ascending order of adsorption of the following gases on the same mass of charcoal at the same mass of charcoal at the same temperature and pressure is 1
(a) $\text{CH}_4 < \text{H}_2 < \text{SO}_2$ (b) $\text{H}_2 < \text{CH}_4 < \text{SO}_2$ (c) $\text{SO}_2 < \text{CH}_4 < \text{H}_2$ (d) $\text{H}_2 < \text{SO}_2 < \text{CH}_4$ (e) $\text{CH}_4 < \text{SO}_2 < \text{H}_2$
- 2) Decomposition of H_2O_2 can be prevent in presence of 1
(a) glycerol (b) acetanilide (c) phosphoric acid (d) all of these
- 3) When an excess of a very dilute aqueous solution of KI is added to a very dilute aqueous solution of silver nitrate, the colloidal particles of silver iodide are associated with which of the following Helmholtz double layer ? 1
(a) $\text{AgI} : \text{Ag}^+ : \text{I}^-$ (b) $\text{AgI} : \text{K}^+ : \text{NO}_3^-$ (c) $\text{AgI} : \text{NO}_3^- : \text{Ag}^+$ (d) $\text{AgI} : \text{I}^- : \text{K}^+$
- 4) The coagulation of 200 mL of a positive colloid took place when 0.73 g HCl was added to it without changing the volume much. The flocculation value of HCl for the colloid is 1
(a) 0.365 (b) 36.5 (c) 100 (d) 150 (e) 200
- 5) Which of the following are negatively charged sols ? 1
(a) Gold sol (b) Prussian blue dye (c) Haemoglobin (d) Starch
- 6) Increasing the adsorbing power of an adsorbent by subdividing it is called.....of the solid adsorbent. 1
- 7) The technique of separation of the components of a mixture in the solution based on their differential adsorption is called..... 1
- 8) The type of colloidal dispersion obtained when egg protein is mixed with water is called..... 1
(multimolecular or macromolecular or associated colloid).
- 9) The minium milligrams of a protective colloid to be added to 10 mL red gold sol that no coagulation takes place when 1mL OF 10% NaCl solution is rapidly added to it is called its..... 1
- 10) In which of the following does adsorption take place and why? (i) Silica gel placed in the atmosphere saturated with water. (ii) Anhydrous CaCl_2 placed in the atmosphere saturated with water. 1

Section - B

- 11) Differentiate between homogeneous and heterogeneous catalysis with one example of each. 2
- 12) What is the sign of ΔH and ΔS when bromine gas gets adsorbed on charcoal? 2
- 13) What is coagulation value or flocculation value of electrolyte? What is the relationship between coagulation value and coagulation power? 2

- 14) What are lyophilic and lyophobic colloids? Which of these sols can be easily coagulated on the addition of small amounts of electrolytes? 2
- 15) What are enzyme catalysts? Give two examples of enzyme catalysis reactions 2

Section - C

- 16) What is an adsorption isotherm? Describe Freundlich adsorption isotherm. 3
- 17) Explain the following terms: 3
- (i) Electrophoresis
 - (ii) Dialysis
 - (iii) Tyndall effect
- 18) (a) In which of the following does adsorption take place and why? (i) Silica gel placed in the atmosphere saturated with water. (ii) Anhydrous CaCl_2 placed in the atmosphere saturated with water. (b) How does BF_3 act as a catalyst in industrial process? (c) Give an example of shape-selective catalysis. 3
- 19) What is the difference between physisorption and chemisorption? 3
- 20) 50 mL of 1M oxalic acid is shaken with 0.5 g of wood charcoal. The final concentration of the solution after adsorption is 0.6M. Calculate the amount of oxalic acid adsorbed per gram of charcoal. 3

Section - D

- 21) Radha and Meera are fast friends. They both study in class XII. Radha is a student of science while Meera follows commerce stream. One day, when they were playing, Radha got hurt and started bleeding. Meera took her to house and applied some alum on the cut. The bleeding stopped immediately. 5
- (i) Why bleeding stopped when some alum is applied on the cut?
 - (ii) What are the values associated with Meera's decision to take Radha to her house and apply alum on her cut?
- 22) 1 g of charcoal adsorbs 100 ml of 0.5 M CH_3COOH to form a monolayer, and thereby the molarity of CH_3COOH reduces to 0.49 M. Calculate the surface area of the charcoal adsorbed by each molecule of acetic. Surface area of charcoal = $3.01 \times 10^2 \text{ m}^2 \text{ g}$ 5
- 23) The volume of nitrogen gas v_m (measured at S.T.P) required to cover a sample of silica gel with a mono-molecular layer is $129 \text{ cm}^3 \text{ g}^{-1}$ of gel. Calculate the surface area per gram of the gel if each nitrogen molecule occupies $16.2 \times 10^{-20} \text{ m}^2$ 5
