Single Correct Answer Type:

1. For precipitating As_2S_3 solution the flocculating power of Al^{3+}, Ba^{2+} and Na^+ is in the order of.

   (A) $Na^+ > Ba^{2+} > Al^{3+}$ (B) $Ba^{2+} > Al^{3+} > Na^+$ (C) $Al^{3+} > Ba^{2+} > Na^+$ (D) $PO_3^{4-} > S^{2-} > Cl^-$

2. Identify the correct statement regarding enzymes:

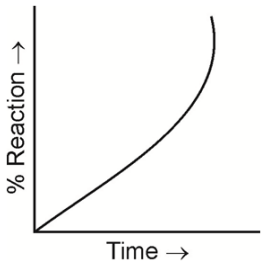
   (A) Enzymes are specific biocatalysts that can normally function at a very low temperature (about 100K)

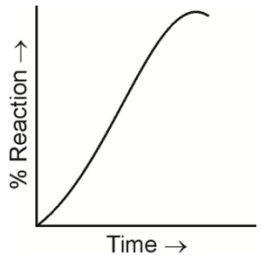
   (B) Enzymes are normally heterogeneous catalysts that are specific biological catalysts that are very specific in action

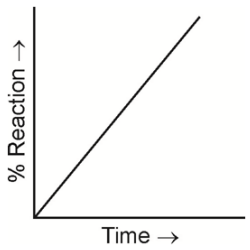
   (C) Enzymes are specific biological catalysts which cannot be poisoned

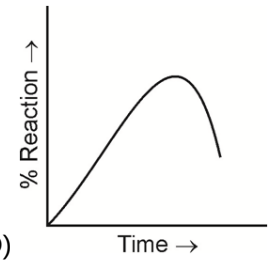
   (D) Enzymes are specific biological catalysts which possesses well defined active sites.

3. The graph represents auto catalysis is:

   (A) 

   (B) 

   (C) 

   (D) 

4. Below critical micelle concentration (CMC) sodium oleate in aqueous solution

   (A) exists largely as micelles of anions

   (B) dissolve substances like grease, fat, etc. colloidally

   (C) increases the viscosity of water abruptly

   (D) behaves as strong electrolyte

5. The gold numbers of protective colloids, A, B, C and D are 0.5, 0.01, 0.10 and 0.005 respectively. The correct order of their protective power is:

   (A) D< A < C < B (B) C < B < D < A (C) A < C < B < D (D) B < D < A < C

6. Point out the false statement

   (A) Brownian movement and Tyndall effect are shown by colloidal systems.

   (B) Gold number is a measure of the protective power of a lyophilic colloid

   (C) The colloidal solution of a liquid in liquid is called gel

   (D) Hardy-schulze rule is related with coagulation.

7. Cloud or fog is a colloidal system in which the dispersed phase and the dispersion medium are:

   (A) Gas , liquid (B) Liquid , gas (C) Liquid, liquid (D) Solid, liquid

8. Which of the following electrolytes will have maximum coagulating value for AgI/Ag^+ sol?

   (A) Na_sS (B) Na_3PO_4 (C) Na_2SO_4 (D) NaCl

9. Hardy-Schulze law states that

(A) higher the charge of the coagulating ions, greater its coagulating power, having opposite sign of solution

(B) Solution must have zero gold number

(C) dispersion medium and dispersed phase must be of same sign

(D) micelles coagulate in the presence of surfactants

10. Which of the following statements is correct for Tyndall effect?

(A) Scattering and polarizing of light by small suspended particles.

(B) Tyndall effect of colloidal particles is due to dispersion of light.

(C) Tyndall effect is due to refraction of light.

(D) Zig-zag motion of suspended particles.

11. The values of colligative properties of colloidal solution are of small order in comparison to those shown by true solutions of same concentration because of colloidal particles

(A) exhibit enormous surface area (B) remain suspended in the dispersion medium

(C) forms lyopholic colloids (D) are comparatively less in number

12. A plot of $\log\left(\frac{x}{m}\right)$ versus log P for the adsorption of a gas on the surface of a solid gives a straight line with slope equal to

(A) log K (B) – log K (C) N (D) 1/n

13. Which equation represents Freundlich adsorption isotherm

(A) $\frac{x}{m} = K(P)^{\frac{1}{n}}$; Where x is the amount of gas adsorbed.

(B) $\log\frac{x}{m} = \log k + \frac{1}{n}\log p$ (C) $\frac{x}{m}$ = K.P at low pressure and $\frac{x}{m}$ = k at high pressure

(D) All of the above

14. Which statement is correct about the rate of chemisorption?

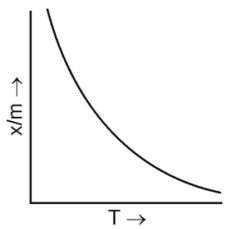
(A) Increases with decrease in temperature

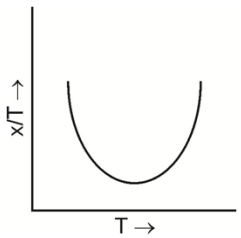
(B) First Increases with increase in temperature than decreases at constant pressure.

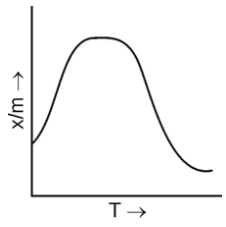
(C) Decrease with increase in pressure.

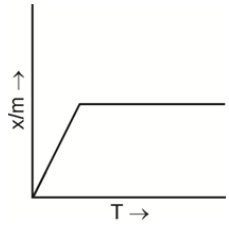
(D) Increases with increase in pressure.

15. Which plot is the adsorption isobar for chemisorption, where X is the amount of gas adsorbed on mass m (at constant pressure) at Temperature (T)

(A) 

(B) 

(C) 

(D) 

16. An emulsion cannot be broken by

I. heating II. adding more amount of dispersion medium

III. freezing IV. adding emulsifying agent

The correct answer is

(A) I and II (B) II and III (C) II and IV (D) I, II and III

17. One gram of activated charcoal has a surface area of $10^3 m^2$. If complete coverage by monolayer is assumed, how much NH_3 in cm^3 at STP would be absorbed on the surface of 25g of the charcoal. Given diameter of NH_3 molecule = 0.3nm

(A) 18.681 Litre (B) 21.631 Litre (C) 13.168 Litre (D) 893.2 Litre

18. 1 gram of charcoal adsorbs 100 ml of 0.5M CH_3COOH to form a monolayer and thereby the molarity of CH_3COOH reduces to 0.49. Calculate the surface area of charcoal adsorbed by each molecule of acetic acid. Surface area of charcoal $=3.01\times10^2 m^2/g$.

(A) $8\times10^{-19} m^2$ (B) $6\times10^{-19} m^2$ (C) $15\times10^{-19} m^2$ (D) $5\times10^{-19} m^2$

19. It is observed that five hours are needed to dissolve a 1cm cube of NaCl in large amount of water. Calculate the time required for dissolution, if cube is ground to a powder containing 10^{16} equal sized spheres. Assume that the rate of dissolution is directly proportional to initial area of contact between NaCℓ and water.

(A) 0.51 sec (B) 0.61 sec (C) 0.41 sec (D) 0.71 sec

20. Gold number of gum Arabic is 0.15. The amount of gum Arabic required to protect 100 mL of red gold solution from coagulation by 10 mL of 10% NaCl solution is

(A) 0.15 millimoles (B) 0.15 mg (C) 1.5 millimoles (D) 1.5 mg

Numerical Based:

21. Calculate the surface area of a catalyst in m^2 that adsorb $10^3 cm^3$ of nitrogen reduced to STP per gram in order to form the monolayer. The effective area occupied by N_2 molecule on the surface is $1.62\times10^{-15} cm^2$

22. On addition of one mL solution of 10% NaCl to 10mL gold solution in the presence of 0.025g of starch, the coagulation is just prevented starch has the following gold number.

23. 20% surface sites have adsorbed N_2. On heating N_2 gas is evolved from sites and were collected at 0.001 atm and 298k in a container of volume $2.41 cm^3$. Density of surface sites is $6.023\times10^{14} cm^{-2}$ and surface area is $1000 cm^2$. Find out the number of surface sites occupied per molecule of N_2.

24. Plot of log $\frac{x}{m}$ against log P is a straight line inclined at an angle of 45°. When the pressure is 0.5 atm and Freundlich parameter, k is 10, the amount of solute in grams adsorbed per gram of absorbent will be (log 5 = 0.6990)

25. H_2 gas was adsorbed on 1g powdered copper surface forming monolayer of molecules. On desorption total H_2 collected measured 1.36 cm^3 at STP Assuming that volume of 1 molecule of H_2 $4.742\times10^{-23} cm^3$. The specific area of copper powder is $x\times10^4 cm^2$, then find value of x is ____

KEY

1.	C	2.	D	3.	B	4.	D	5.	C
6.	C	7.	B	8.	B	9.	A	10.	A
11.	D	12.	D	13.	D	14.	B	15.	C
16.	C	17.	C	18.	D	19.	C	20.	D
21.	4350	22.	25	23.	2	24.	5	25.	5.7