CHEMISTRY

JEE (MAIN AND ADVANCED) CHEMISTRY

SURFACE CHEMISTRY

EXAMPLES

1. Why does physisorption decrease with the increase of temperature ?

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2. Critical temperature of SO_2, N_2, NH_3 and CH_4 are 430 K, 126K, 406 K and 356 K. Arrange in the descending order of volume of these gases adsorbed per gram of charcoal.

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3. Per two gram of charcoal, a gas is adsorbed by 0.1 g and 0.2 g at 10 torr and 80 torr pressure respectively. Calculate the n value in Freundlich adsorption isotherm.

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4. The coagulation of 100 ml gold sol is completely prevented by adding 0.25 g of starch to it before adding 10 ml of 10% NaCl solution. Calculate the gold number of starch.

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5. Write the catalyst and equations of ostwald's process.

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6. What role does adsorption play in heterogenous catalysis ?

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7. Why is ester hydrolysis slow iin the beginning but is fast after sometime ?

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8. Why is it necessary to remove CO when ammonia is obtained by Haber's process?

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9. How to save a patient suffering from kidney failure?

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10. Why are hydrophobic sols easily coagulated ?

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11. Tyndall effect is observed during the projection in a cinema theatre. Why?

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12. Is it possible to know the size and shape of colloidal particles by using ultramicroscope?

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13. For coagulation of 10ml of a positive sol, the volume of 1M each $NaCl$, Na_2SO_4, Na_3PO_4 and $Na_4\left[Fe(CN)_6\right]$ required separately are P,Q, R and S ml respectively. Arrange P, Q , R and S in the descending order.

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14. Ferric chloride forms both positively and negatively charged sols. Explain.

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15. One gram of charcoal adsorbs 100 ml of 0.5 M CH_3COOH to form a monolayer and thereby the molarity of acidic acid is reduced to $0.49M$. Calculate the surface area of the charcoal adsorbed by each molecule of acetic acid (surface area of charcoal is $3.01 \times 10^2 m^2/g$).

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16. Gold numbers of four protective colloids A, B, C and D are 0.5 , 0.01, 0.1 and 0.005 respectively. Arrange them in the correct order of their protective power.

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17. Comment on artificial rain.

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18. It is essential to wash a precipitation with water before its quantitative estimation . Why ?

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19. For the coagulation of 100 ml of arsenious sulphide solution, 5ml of 1M NaCl is required. Calculated the flocculation value .

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20. Write the difference in the size of stearte anion and stearate micelle.

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23. How are emulsion useful in digestion ?

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EXERCISE - 5.1.1

1. Explain the terms " adsorption" and "absorption" with at least two example .Give the differences between physical adsorption and chemical

adsorption.

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2. Given an account of adsorption of gases by metals with examples.

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3. Discuss the characteristics of physical adsorption.

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4. Write any two characteristics of Chemisorption.

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5. Give an account of Freundlich adsorption isotherm.

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6. Why does physisorption decrease with the increase of temperature ?

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7. Why are finely powdered substances more effective adsorbents than their non powdered crystal forms ?

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8. Explain adsorption of solute from solutions with examples.

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EXERCISE - 5.1.2

1. What is catalysis ? How is catalysis classified ? Give two examples for each type of catalysis.

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2. What are the characteristics of a catalyst?

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3. Explain homogeneous and heterogeneous catalysis. Given two examples for each. Given their mechanisms.

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4. Explain intermediate compound formation theory of catalysis with two examples .

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5. Explain the adsorption theory of catalysis with one example.

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6. Why is ester hydrolysis slow iin the beginning but is fast after sometime ?

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7. What is role of desorption in the process of adsorption catalysis .

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EXERCISE - 5.1.3

1. Give the difference between ' colloidal solutions ' and 'true solutions' .

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2. Explain the terms dispersed phase and dispersion medium with reference to smoke . cloud, blood, gold , sol, starch sol and milk .

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3. Distinguish between lyophilic and lyophobic sols.

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4. Write the chemical methods of preparing lyophobic colloids .

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5. What are protective colloids ? Define and explain gold number .

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6. Explain the terms dialysis and electrodlysis.

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7. Explain Tyndall effect and Brownian movement .

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8. What is coagulation ?

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9. State Hardy-Schulze rule .

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10. Demonstrate the electrophoresis experiment.

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11. Why is it essential to wash the precipitate with water before estimating it quantitatively?

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12. Mention four colloids around us. Discuss their significance .

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13. Write some important applications of colloids .

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EXERCISE - 5.1.4

1. What are emulsions? What are their different types? Give example of each type.

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2. What is a micelle? Give an example of micelle formation .

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3. Explain the phenomenon of cleaning of clothes by using detergents and soaps.

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4. Write the important applications of emulsions.

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EXERCISE - 5.2

1. Adsorption of a gas on the surface of solid is generally accompanied by decrease entropy. Still it is a spontaneous process. Explain.

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2. How the distinguish between physisorption and chemisorption with the help of graphs.

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3. For the coagulation of 100ml of a positive sol 10ml of 1M sodium chloride is required. Calculate the flocculation value.

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4. How to distinguish lyophilic and lyophobic with tyndall effect?

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5. What are for cationic and anionic surfactants ? Give examples.

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6. Which property can be used to distinguish colloidal solutions and true solutions?

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7. Transition metals are efficient catalysis Substantiate

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8. Colloids sulphur exhibits Brownian movement , while a solution in CS_2 does not why ?

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9. What is peptisation ?

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10. What is Helmholtz electrical double layer ?

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11. The change of colloidal particles is responsible for the stability of sols. Explain.

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12. A negative change solution is obtained when Ferricchloride is added to cuasic soda solution. Explain.

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13. Why the colour of gold sol change with the size of gold particles?

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14. Write the characteristics and importance of bio-catalysis.

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15. Rate of fruit fermentation increase with time why?

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16. The decolourisation of permanganate with oxalate is initially slow, but gains momentum after some time. Why?

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17. How the colloids are classified on the basis of type of particles in dispersed phase?

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18. Explain the purification of colloids by dialysis and ultrafiltration.

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19. What is ultrafiltration ?

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20. Arrange the following substances in order of increasing ability to coagulate i) negative change sol and ii) a positively change sol: $X) ZnSO_4, Y) AlCl_3$ and $Z) Na_3PO_4$.

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21. A catalyst lowered the energy of activation by $25kJmol^{-1}$ .How many times , the rate reaction increases?

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22. Presence of catalysis does not change equilibrium constant. Why?

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23. Why the reaction between nitric acid and copper is slow in the beginning but fast after some time?

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24. During the micelle formation how the enthalpy entropy and Gibbes energy change?

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25. Gold number of gelatin is 0.01 , Calculate the weight of gelatin to be added to 50 ml of gold to stop coagulation when 5ml of 10% NaCI added .

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26. The surface are of activated charcoal is $10^3 m^3 g^{-1}$.If effective surface area of ammonia molecule is $0.129 nm^2$ and complete monolayer coverage is assumed. how much ammonia at STP could be adsorbed on 10g of charcoal?

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27. 20% surface sites have adsorbed N_2. On heating N_2 gas is evolved from sites and were collected at $25^\circ C$ and 0.001 atm in a container of volume $2.46cm^3$. Density of surface sites is $6 \times 10^4 cm^{-2}$ and surface area is $10^3 cm^2$.Find the number of surface sites occupied per molecule of N_2.

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28. A molecule of nitrogen occupies $1.62 \times 10^{-19} m^2$. The volume of nitrogen at $0^\circ C$ and 1.013 atm required to cover a sample of silica gel with unimolecular layer is $129 cm^3 g^{-1}$ of gel. Calculate the surface area per gram of gel?

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29. What is electro osmosis ?

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30. $0.1MAlCl_3$ solution is more effective than $0.1MNaCl$ solution in coagulating arsenious sulphide sol while 0.1 M $AlCl_3$, is less effect than $0.1MNa_3PO_4$, solutions in coagulating ferric oxide sol. Why?

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31. For coagulation of 20ml of a negative sol Xml of 1M $NaCl, Ymlof1MBaCl_2$ and Zml of $AlCl_3$ are required separately . What is the correct order of X.Y and Z, values ?

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32. One gram of a protective colloid 'X' is to be added to 200ml of gold sol to prevent coagulation of it when 20 ml of 10% NaCl is added. Calculate the gold number of protective colloid 'X'.

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33. Soap forms a true solutions a lower concentration. but forms a colloidal solution at higher concentrations. Explain.

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34. Soap does not work properly in aqueous solutions with acidic pH values. Why ?

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35. What is de-emulsification process ? How is it performed ?

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PROBLEMS

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4. In Langmuir adsorption isotherm, what is the slope and Y-intercept?

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5. The curve showing variation of x/m with temperature is inverted 'V' shape. What is the type of adsorption ?

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20. How are associated colloids different from multimolecular and macromolecular colloids?

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SUBJECTIVE EXERCISE - 1 (SHORT ANSWER QUESTIONS)

1. Explain the terms "adsorption" and "absorption" with at least two examples.

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2. Give the differences between physical adsorption and chemical adsorption.

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3. Give an account of Freundlich adsorption isotherm

Watch Video Solution

4. Explain adsorption of solute from solutions with examples.

Watch Video Solution

5. Give an account of adsorption of gases by metals with examples.

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SUBJECTIVE EXERCISE - 1 (VERY SHORT ANSWER QUESTIONS)

1. Give the effect of temperature on adsorption of gases by metals.

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2. What is adsorption ? Explain different types of adsorptions with suitable examples.

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3. What is physical adsorption ? Give an example.

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4. What is chemical adsorption ? Give an example.

Watch Video Solution

5. What is adsorption ? Explain different types of adsorptions with suitable examples.

Watch Video Solution

6. Write any four differences between physical adsorption and chemical adsorption.

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7. What is the type of adsorption involved in the Dewar method of separation of inert gases ?

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8. The curve showing variation of x/m with temperature is inverted 'V' shape. What is the type of adsorption ?

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SUBJECTIVE EXERCISE - 2 (SHORT ANSWER QUESTIONS)

1. What is catalysis ? How is catalysis classified ? Give two examples for each type of catalysis.

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2. What are the characteristics of a catalyst?

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3. Explain homogeneous and heterogeneous catalysis. Give two examples for each. Give their mechanisms.

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4. Explain the adsorption theory of catalysis with one example.

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5. Explain with examples the following:

(i) Promotor and ii) Autocatalyst

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6. How is catalysis classified ? Give two examples.

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7. What are enzymes ? Write in brief the mechaism of enzyme catalysis.

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SUBJECTIVE EXERCISE - 2 (VERY SHORT ANSWER QUESTIONS)

1. What is homogeneous catalysis ? How is it different from heterogeneous catalysis ?

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2. What is hetergeneous catalysis.

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3. What are the catalysts used in the reaction.

i) $N_{2(g)} + 3H_{2(g)} \rightarrow 2NH_{3(g)}$

ii) $2SO_{2(g)} + O_{2(g)} \rightarrow 2SO_{3(g)}$

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4. What do you mean by activity and selectivity of catalyst ?

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5. What is negative catalyst ? Give example.

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SUBJECTIVE EXERCISE - 3 (SHORT ANSWER QUESTIONS)

1. What are colloids. Give the differences between 'colloidal solutions' and 'true solutions'.

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2. Explain the terms dispersed phase and dispersion medium with reference to smoke, cloud, blood, gold sol, starch sol and milk.

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3. What are protective colloids? Define and explain gold number.

Watch Video Solution

4. Distinguish between lyophilic and lyophobic sols.

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5. How are colloids classified ? Give examples.

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6. Explain coagulation with suitable examples.

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7. Explain the terms : electrophoresis, zeolite and dialysis.

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8. Write in brief about applications of co!loids.

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SUBJECTIVE EXERCISE - 3 (VERY SHORT ANSWER QUESTIONS)

1. Explain Tyndall effect and Brownian movement.

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2. What is coagulation ? Explain with suitable examples.

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3. What is a gold sol and gold number?

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4. What is protective colloid ?

Watch Video Solution

5. How are colloids classified ? Give examples.

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6. Starch solution is not coagulated by the addition of salt solution but gold sol is coagulated. Why?

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7. What is electrodialysis ?

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SUBJECTIVE EXERCISE - 4 (SHORT ANSWER QUESTIONS)

1. How is cream converted into butter?

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2. Discuss the mechanism of micelle formation

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3. What are emulsions? What are their different types? Give example of each type.

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4. Explain the phenomenon of cleaning of clothes by using detergents and soaps.

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SUBJECTIVE EXERCISE - 4 (VERY SHORT ANSWER QUESTIONS)

1. What is a micelle? Give an example of micelle formation.

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2. Write any two important applications of the emulsions.

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3. Give one example each of soap and detergent.

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4. What are head and tail in stearate ion ?

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5. What is critical micelle concentration (CMC) and kraft temperature (T_k) ?

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OBJECTIVE EXERCISE - 1 (ADSORPTION)

1. Adsorption is the phenomenon in which a substance

A. accumulates on the surface of other substance

B. goes into the body of the other substance

C. remains close to the other substance

D. does not accumulates on the surface of the other substance.

Answer: A

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2. (A): Adsorption is a surface phenomenon.

(R) : During adsortion, residual force of surface decreases

A. Both (A) and (R) are true (R) explains properly (A)

B. Both (A) and (R) are true (R) does not explain (A)

C. (A) is ture, (R) is false.

D. (A) is false, (R) is true.

Answer: B

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3. Adsorption phenomenon involves

(A) residual attraction forces

(B) a spontaneous phenomenon

(C) a gaseous adsorbent

A. A and C are correct

B. B and C are correct

C. A and B are correct

D. A, B and C are all correct

Answer: C

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4. In adsorption of oxalic acid on activated charcoal, the activated charcoal is called

A. adsorbent

B. adsorbate

C. adsorber

D. absorber

Answer: A

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5. Valence forces cause

A. chemisorption

B. Ionic bond

C. sorption

D. adsorption involving multi layers

Answer: A

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6. The bond between the adsorbate and adsorbent in chemisorption is

A. ionic bond

B. covalent bond

C. either ionic or covalent bond

D. Vanderwall forces

Answer: C

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7. The nature of forces operating between the adsorbate and the adsorbent in the adsorption occuring at high temperature is

A. vander Waals forces

B. chemical forces

C. gravitational forces

D. fermi forces

Answer: B

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8. Which of the following statements is true in the case of physical adsorption of gases on solids

A. it is exothermic process

B. it depends on the ease of liquification of the gas

C. it decreases with increase in temperature

D. all the above

Answer: D

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9. Which of the following is chemisorption

A. adsorption of H_2 on Ni at high temperature

B. adsorption of H_2 on charcoal

C. adsorption of moisture on silica gel

D. dehydration by using anhydrous $CaCl_2$

Answer: A

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10. Adsorption is multilayered in case of

A. Chemisorption

B. desorption

C. physical adsorption

D. both chemisorption and desorption

Answer: C

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11. Which of the following is not a characteristic of chemisorption

A. It is irrversible

B. it is specific

C. it is multi layer phenomenon

D. heat of adsorption is about 40 - 400 KJ

Answer: C

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12. The temperature above which a gas cannot be liquified even on application of high pressure is called

A. boiling point

B. freezing point

C. critical temperature

D. Boyle's temperature

Answer: C

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13. The higher the critical temperature of the gas

A. greater is its extent of adsorption

B. lower its adsorption

C. lesser is the case of liquification

D. lesser is its volatile nature

Answer: A

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14. Freundlich adsorption isotherm is given by the expression $\frac{x}{m} = kp^{1/n}$. Then the slope of the line in the following plot is

A. $\sqrt{n}$

B. $1/n$

C. x/m

D. p

Answer: B

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15. The plot of x/m versus temperature at constant pressure is called

A. adsorption isotherm

B. adsorption isobar

C. adsorption isochore

D. Freundlich isotherm

Answer: B

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16. Which of the following is adsorbed to a maximum extent on a given amount of adsorbent?

A. H_2

B. N_2

C. O_2

D. SO_2

Answer: D

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17. Which statement is correct about physical adsorption?

A. It is highly specific

B. It is unimolecular layer adsorption

C. It depends on critical temperature of adsorbate

D. It is irreversible

Answer: C

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18. When $0.1MCH_3COOH$ solution is shaken with activated charcoal and the charcoal is filtered out, the concentration of acid -

A. Increases

B. Decreases

C. Remains unchanged

D. Can't say

Answer: B

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19. The phenomenon of simultaneous absorption and adsorption is called -

A. Sorption

B. Desorption

C. Chemisorption

D. Absorption

Answer: A

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20. $\frac{x}{m} = KC^{1/n}$ where $C =$ Concentration of a m solution, x = wt of adsorbed solute m =Wt of adsorbent. The equation represents -

A. Langmuir adsorption isotherm

B. Freundlich adsorption isotherm

C. Arhenius equation

D. Chemi sorption isotherm

Answer: B

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21. A graph drawn between $'\log. \frac{x}{n}'$ and log p on 'X' and 'Y' axis respectively could be - regarding physical adsorption

A. A hyperbola

B. A parabola

C. A straight line with positive slope

D. A straight line with negative slope

Answer: C

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22. Which of the following is not correct

A. Enthalpy of physical adsorption is less when compared to enthalpy of chemical adsorption

B. Milk is an example of emulsion

C. Physical adsorption increases with increase in temparature

D. Smoke is an aerosol

Answer: C

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23. Which of the following can not act as an adsorbent?

A. Silica gel

B. Clay

C. Oxygen gas

D. Activated charcoal

Answer: C

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24. Which can adsorb maximum amount of H_2?

A. A platinum black

B. Powdered palladium

C. A platinum rod

D. Nickel sphere

Answer: B

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25. During activation of charcoal -

A. O_2 is adsorbed on charcoal

B. Moisture is absorbed on charcoal

C. Pre adsorbed material is desorbed

D. Charcoal is covered with inert gas

Answer: C

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26. The energy of molecules present on the surface of a substance is -

A. Equal to that of molecules is bulk

B. Greater than that of interior molecules

C. Less than that of interior molecules

D. Dependent on nature of substance

Answer: B

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27. Which of the following is not correct

A. Physical adsorption decreases in the increase in temperature.

B. Physical adsorption is multi layered

C. Activation energy of physical adsorption is very high

D. enthalpy change of physical adsorption is about $20Kjmol^{-1}$

Answer: C

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28. The correct combination from the following given statements about chemisorption

I) It is unilayered adsorption

II) It is irreversible and takes place slowly

III) It occurs rapidly

The correct combination is

A. Both I and II are correct

B. Both II and III are correct

C. Both I and III are correct

D. All are correct

Answer: A

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29. The correct statements from the following about physical adsorption

I) desorption of adsorbate gas from adsorbent is not easy since chemical forces are involved

II) Its energy of activation is very low.

III)Easily liquifiable gases are more readily adsorbed.

A. all are correct

B. only (II) and (III)

C. only (I) and (III)

D. only I and II

Answer: B

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30. The following are some statements about adsorption of solutes from the solutions.

A) Increase in the surface area of the adsorbent increases the extent of adsorption.

B) Increase in temperature decreases the extent of adsorption.

C) The extent of adsorption (x/m) is related to the molar concentration of solution (c) is given by $x/m = k.\, c^{1/n}$

The correct combination is

A. only (A) and (C)

B. only (B) and (C)

C. only (A) and B

D. all are correct

Answer: D

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31. The following are some statements about physical adsorption

A) involves the weak Vanderwaals interaction between the adsorbate and adsorbent.

B) Involves the chemical interactions between the adsorbent and adsorbate

C) is irreversible in nature

D) It depends upon both nature of adsorbent and adsorbate

The correct combination is

A. all are correct

B. only (A) and (B)

C. only (A) and (C)

D. only (A)

Answer: D

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	Concentration process	Name of process
	A) Hydrogen on finely	1) Physisorption
32.	divided palladium	2) Chemisorption
	B) Hydrogen on nickel	3) Occlusion
	C) Hydrogen on charcoal	4) Desorption

The correct match is

A. $\begin{matrix} A & B & C \\ 1 & 2 & 3 \end{matrix}$

B. $\begin{matrix} A & B & C \\ 3 & 1 & 4 \end{matrix}$

C. $\begin{matrix} A & B & C \\ 3 & 2 & 1 \end{matrix}$

D. $\begin{matrix} A & B & C \\ 4 & 3 & 2 \end{matrix}$

Answer: C

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OBJECTIVE EXERCISE - 1 (CATALYSIS)

1. A catalyst

A. increases the average kinetic energy of reacting molecules

B. increases the activation energy

C. alters the reaction mechanism

D. increases the frequency of collisions of reacting species

Answer: C

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2. The rate of a chemical reaction is increased in presence of a catalyst. This is because

A. activation energy of the reaction is less in the new path

B. heat of reacton is decreased

C. threshold energy is increased

D. activation energy of the new path is more

Answer: A

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3. In heterogeneous catalytic reactions involving solid catalyst and gaseous reactants, the catalysts, most generally used are

A. metals

B. metal oxides only

C. transition metals only

D. transition metals and transition metal oxides

Answer: D

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4. An inhibitor is essentially

A. a negative catalyst

B. an auto catalyst

C. a homogeneous catalyst

D. a heterogeneous catalyst

Answer: A

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5. The process which is catalysed by one of the products is called

A. Acid - base catalysis

B. Auto catalysis

C. Negative catalysis

D. Positive catalysis

Answer: B

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6. Which of the following reactions is an example of heterogeneous catalysis

A. $2CO_{(g)} + O_{2(g)} \xrightarrow{NO(g)} 2CO_{2(g)}$

B. $2SO_{2(g)} + O_{2(g)} \xrightarrow{NO(g)} 2SO_{3(g)}$

C. $2CO_{(g)} + O_{2(g)} \xrightarrow{Pt(s)} 2CO_{2(g)}$

D. $CH_3CHO_{(g)} \xrightarrow{I_2(g)} CH_{4(g)} + CO_{(g)}$

Answer: C

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7. The catalyst used to increase the dissociation of H_2O_3 is

A. Acetanilide

B. Glycerol

C. H_3PO_4

D. Caustic soda

Answer: D

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8. A catalyst increases the rate of a reaction with out changing _____

A. energy of activation

B. Heat of the reaction

C. Path of reaction

D. Mechanism of reaction

Answer: B

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9. Catalytic action of an enzyme is

A. Highly specific

B. Non specific

C. Does not depend on nature of substrate

D. Common for many biochemical reactions

Answer: A

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10. In which of these processes platinum is used as a catalyst ?

A. Oxidation of ammonia to form HNO_3

B. Hardening of oils

C. Production of synthetic rubber

D. Synthesis of methanol

Answer: A

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11. Which of the following catalyst is used for preparing toluene by reacting benzene with methyl chloride ?

A. Ni

B. Anhydrous $AICI_3$

C. Pd

D. Pt

Answer: B

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12. A biological catalyst is

A. An amino acid

B. A carbohydrate

C. The nitrogen molecule

D. An enzyme

Answer: D

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13. During the cleaning action of soap - part of soap dissolves in the dirt and encapsulates to form micelle

A. both hydrophyllic and hydrophobic

B. hydrophyllich

C. hydrophobic

D. Cation

Answer: C

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14. Colloidal solution of gold prepared by different methods have different colours, because

A. variable valencies of gold

B. difference in the concentration of gold particles

C. impurities produced by different methods

D. difference in the diameter of colloidal gold particles

Answer: D

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15. Which of the following is an example of a heterogeneous catalytic reaction

A. $2SO_{2(g)} + O_{2(g)} \xrightarrow{NO(g)} 2SO_{3(g)}$

B. Hydrolysis of an aqueous solution of sugar in presence of a mineral acid

C. $2H_2O_{2(l)} \xrightarrow{Pt(s)} 2H_2O_{(l)} + O_{2(g)}$

D. Hydrolysis of liquid ester in the presence of aqueous mineral acid

Answer: C

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16. Which of the following is a lyophobic solution?

A. aqueous starch solution

B. aqueous protein solution

C. gold sol

D. polymer solutions in some organic solvents

Answer: C

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17. Which of the following is correct

A. Catalyst undergoes permanent chemical change

B. Particle size of solute in a true solution is $10^{-3}m$

C. Starch solution is a hydrosol

D. Hydrolysis of liquid ester in the presence of a mineral acid is an example of a hetero eneous catalytic reaction

Answer: C

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18. Which of the following is an example for auto catalysis

A. $CH_3COOC_2H_{5(l)} + H_2O_{(l)} \rightarrow CH_3COOH_{(l)} + C_2H_5OH_{(l)}$

B. $N_{2(g)} + 3H_{2(g)} \rightarrow 2NH_{3(g)}$

C. $2SO_{2(g)} + O_{2(g)} \rightarrow 2SO_{3(g)}$

D. $C_{12}H_{12}O_{11(l)} \rightarrow C_6H_{12}O_{6(l)} + C_6H_{12}O_{6(l)}$

Answer: A

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19.

LIST - 1	LIST - 2
A) Positive catalyst	1) H_2S to iron in Habers process
B) Negative catalyst	2) 'CO' to preparation of SO_3
C) Catalytic poison	3) Glycerol to prevent decomposition of H_2O_2
D) Promoter	4) MnO_2 in the decomposition of $KClO_3$
	5) Mo to Fe in Habers process

The correct match is

A.

A	B	C	D
4	3	5	2

B.

A	B	C	D
3	4	2	1

C.

A	B	C	D
4	3	1	5

D.

A	B	C	D
1	5	3	2

Answer: D

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	Name of reaction	Catalyst
	A) Hydrogenation of oils	1) Fe
20.	B) Ostwald's process	2) Ni
	C) Contact's process	3) V_2O_5
	D) Haber's process	4) Pt

The correct match is

A. $\begin{matrix} A & B & C & D \\ 2 & 3 & 1 & 4 \end{matrix}$

B. $\begin{matrix} A & B & C & D \\ 2 & 3 & 4 & 1 \end{matrix}$

C. $\begin{matrix} A & B & C & D \\ 3 & 1 & 4 & 2 \end{matrix}$

D. $\begin{matrix} A & B & C & D \\ 2 & 4 & 3 & 1 \end{matrix}$

Answer: C

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OBJECTIVE EXERCISE - 1 (COLLOIDS)

1. (A) : Colloid is a heterogenous system

(R): Colloidal particles have an enormous surface area per gram as a

result of their small size

A. Both A & R are true, R is the correct explanation of A

B. Both A & R are true, R is not correct explanation of A

C. A is true, R is false

D. A is false, R is true

Answer: B

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2. Which of the following is not a colloid

A. milk

B. blood

C. ice cream

D. sugar solution

Answer: D

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3. Crystalloid and colloid can be distinguished by

A. diffusion through membrane

B. particle size

C. solubility

D. chemical composition

Answer: A

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4. Colloidal systems are

A. homogeneous

B. heterogeneous

C. suspensions

D. transparent

Answer: B

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5. The number of phases in a colloidal system is -

A. 1

B. 2

C. 3

D. 4

Answer: B

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6. Particles of which of the following donot pass through ultra filter paper

A. colloids only

B. true solutions

C. suspensions only

D. colloids and suspension

Answer: D

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7. The tyndall effect in colloidal solutions is due to

A. scattering of light

B. reflection of light

C. absorption of light

D. electrically charge of particles

Answer: A

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8. Which of the following is a homogeneous system?

A. suspension

B. colloid solution

C. true solution

D. starch solution

Answer: C

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9. When dispersed phase is solid and dispersion medium is gas, the colloidal system is

A. smoke

B. clouds

C. emulsion

D. milk

Answer: A

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10. When the dispersion medium is alcohol, the collodal sol is known as

A. hydrosol

B. benzosol

C. alcosol

D. aquasol

Answer: C

Watch Video Solution

11. When dispersed phase is liquid and dispersion medium is a solid, the colloid is known as

A. a solution

B. an emulsion

C. a gel

D. a foam

Answer: C

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12. A colloidal solution in which a solid is dispersed in a liquid is called

A. gel

B. emulsion

C. sol

D. precipitate

Answer: C

Watch Video Solution

13. Blood is a colloidal solution of water containing

A. liquid fat as dispersed phase

B. albuminoid as dispersed phase

C. butter as dispersed phase .

D. proteins as dispersed phase

Answer: B

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14. When the dispersed phase has a greater affinity for the dispersion medium, the colloids are termed as

A. Lyophilic

B. lyophobic

C. hydrophobic

D. emulsion.

Answer: A

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15. The disperse phase, dispersion media, and the nature of colloidal solution of gold sol respectively are

A. Solid, solid, Lyophobic

B. Liquid, liquid, lyophobic

C. Solid, liquid, lyophobic

D. Solid, liquid lyophillic

Answer: C

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16. The characteristic property of detergent :

A. is it contains both hydrophilic and hydrophobic groups

B. is it can act as an emulsifier

C. is it enables water and oily substances to form emulsions

D. all the above

Answer: D

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17. The emulsifier for olive oil in water emulsion is

A. soap

B. egg albumin

C. mercuric iodide

D. kerosene

Answer: B

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18. Soap emulsifies

A. oil in water type

B. water in oil type

C. oil in oil type

D. gel in oil

Answer: A

Watch Video Solution

19. Water in benzene is emulsified by

A. soap

B. mercuric iodide

C. egg albumin

D. grease

Answer: B

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20. The kind of colloid that does not exist

A. solid in gas

B. gas in solid

C. solid in solid

D. gas in gas

Answer: D

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21. Disperse phase and the dispersion media in blood respectively are (M-2007)

A. Liquid, solid

B. Liquid, liquid

C. Solid, liquid

D. Solid, solid

Answer: C

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22. The hydrophobic end of lauryl sulphate is

A. $C_{17}H_{35}$

B. $C_{17}H_{33}$

C. $C_{12}H_{25}$

D. $-OSO_3$

Answer: C

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23. Which of the following is not correct

A. Milk is naturally occuring emulsion

B. Gold sol is a lyophilic sol

C. Physical adsorption decreases with rise in temperature

D. Chemical adsorption is unilayered.

Answer: B

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24. Which of the following may form associate colloids?

A. Gold

B. Soap

C. Starch

D. Glucose

Answer: B

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25. Most common emulsifier for vegetable oil, water emulsion is -

A. Carbon powder

B. HgI_3

C. Soap

D. Lyphobic colloid

Answer: C

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26.

LIST - 1 [Colloidal solution]	LIST-2 [Example]
A) Liquid in gas	1) Milk
B) Solid in gas	2) Boot polish
C) Liquid in liquid	3) Smoke
D) Solid in liquid	4) Cloud
	5) Gold sol

A.

A	B	C	D
4	3	1	2

B.

A	B	C	D
2	1	5	4

C.

A	B	C	D
3	3	2	5

D.

A	B	C	D
1	4	3	2

Answer: C

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27.

LIST - 1	LIST-2
A) Colloidal	1) Liquid or solid or gas
B) Crystalloid	2) $1m\mu - 1\mu$
- 14 C) True solution	3) Does not show Tyndall effect
D) Disperse phase	4) Urea
	5) Either liquid or gas but should not be solid

A.

A	B	C	D
2	4	5	3

B.

A	B	C	D
2	3	4	1

C.

A	B	C	D
5	1	3	2

D.

A	B	C	D
2	4	3	1

Answer: B

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28. (A) : Gases between themselves cannot form a colloidal solution.

(R): Gases give homogenous mixture

A. Both A & R are true, R is the correct explanation of A

B. Both A & R are true, R is not correct explanation of A

C. A is true, R is false

D. A is false, R is true

Answer: A

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29. Some statements are given below about lyophillic sol

I) These are solvent hating colloidal solutions

II) These are very stable.

III) All high molecular weight carbon compounds form in water, lyophillic sols.

The correct combination is

A. Both I and Il are correct

B. Both II and III are correct

C. Both I and III are correct

D. All are correct

Answer: B

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30. The following are some statements about micelles

I) These are formed as aggregated particles when soap is applied at lower concen trations

II) The tail part of it dissolves the grease deposit or dirt.

III)Hydrocarbon chain of soap micelle is hydrophillic end and its anion part is hydrophobic end.

The correct combination is

A. All are correct

B. Only I and II

C. Only II and III

D. Only II

Answer: D

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31. The simplest way to check whether a system is colloidal

A. Tyndall effect

B. Browmian movement

C. Electrodialysis

D. Finding out particle size

Answer: A

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OBJECTIVE EXERCISE - 2 (ADSORPTION)

1. Which of the following is not considered as absorption

A. chalk piece dipped in ink

B. sponge placed in water

C. finely divided charcoal stirred with dilute acetic acid

D. H_2 gas in contact with finely divided Pd

Answer: C

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2. Which of the following gases is adsorbed easily and more on activated charcoal

A. $CO_2(T_c = 304K)$

B. $SO_2(T_c = 430K)$

C. $H_2(T_c = 23K)$

D. all gases adsorp to the same extent

Answer: B

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3. Adsorption isotherm of gases on solids give the relation between

A. volume of adsorbent and temperature

B. amount of adsorbent per unit weight of adsorbate and pressure

C. amount of adsorbate per unit weight of adsorbent and equilibrium pressure

D. volume of adsorbate and pressure

Answer: C

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4. Amount of gas adsorbed per gram of adsorbent increases with pressure but after certain limit is reached, adsorption becomes constant. It is when

A. multilayers are formed

B. desorption takes place

C. temperature is increased

D. absorption also starts

Answer: A

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5. Favourable conditions for physical adsorption are

A. low T, high P

B. high T, high P

C. low T, low P

D. low T, low P

Answer: A

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OBJECTIVE EXERCISE - 2 (CATALYSIS)

1. Which of the following kind of catalysis can be explained by the adsorption theory?

A. Homogeneous catalysis

B. Acid - base catalysis

C. Hetero geneous catalysis

D. Auto catalysis

Answer: C

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2. Which of the following processes does not involve a catalyst

A. Haber's process

B. Thermitprocess

C. Ostwald's process

D. Contact process

Answer: B

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3. The catalyst used in the dehydration of ethylalcohol to ethene is

A. Al_2O_3

B. Sb_2O_3

C. As_2O_3

D. Cu

Answer: A

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4. In heterogeneous catalytic reactions, catalyst in the finely divided form possesses higher catalytic reactivity. This is because

A. surface area of the finely divided catalyst is large

B. surface area of the catalyst in the lump form is large

C. finely divided catalyst has more internal energy in it

D. finely divided catalyst has stable surface

Answer: A

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5. When an acid solution of oxalic acid at $80^\circ C$ is titrated with $KMnO_4$ solution, the first few drops of $KMnO_4$ are decoloured slowly but

decolourisation occurs fast later. This is because

A. of increase in the concentration of CO_2 formed

B. one of the products Mn^{+2} acts as auto catalyst

C. both Mn^{2+} and K^+ ions act as auto catalyst

D. $KMnO_4$ catalyses the reaction at the later stages

Answer: B

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OBJECTIVE EXERCISE - 2 (COLLOIDS)

1. Smoke, cloud and gold sol are respectively

A. Aerosol, Hydrosol and Aquasol

B. Hydrosol, Hydrosol and Hydrosol

C. Aquasol, Aerosol and Hydrosol

D. Aerosol, Aerosol and Hydrosol

Answer: D

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2. In colloidal state particle size ranges from

A. $1 - 10\text{Å}$

B. $20 - 50\text{Å}$

C. $10 - 1000\text{Å}$

D. $1 - 280\text{Å}$

Answer: C

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3. What is the emulsifier in milk

A. Caesin

B. Gelatin

C. Albumin

D. Soap

Answer: A

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4. A substance which forms micelles in solutions contains

A. carboxylic group

B. alkyl group

C. water insoluble long hydrocarbon groups and water soluble polar groups

D. water soluble hydrocarbon group and water insoluble polar group

Answer: C

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5. Which of the following is a non electrolytic colloidal sol

A. Starch

B. $AgCl$ sol

C. Arsenic sulphide sol

D. Sb_2S_3 sol

Answer: A

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6. Sodium stearate forms associated colloids

A. due to association of Nations

B. due to dissociation of stearate ion

C. due to orientation of hydrocarbon chain to wards centre of the micelle and COO^- groups towards water

D. due to orientation of COO^- groups towards center of the micelle and hydrocarbon chain towards water

Answer: C

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7. In Faraday-Tyndall effect the colloidally suspended particles

A. trace out the path of strong beam of light

B. undergo coagulation

C. show electrophoresis

D. show brownian movement

Answer: A

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8. Which of the following form micellies in aqueous solution above critical concentration

A. Glucose

B. Urea

C. Dodecyl trimethyl ammonium chloride

D. Pynidum chloride

Answer: C

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9. A micelle formed during the cleansing action by soap is

A. A discrete particle of soap

B. Aggregated particles of soap and dirt

C. A discrete particle of dust

D. An aggregated particle of dust and water

Answer: B

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10. $CH_3COCl + H_2 \xrightarrow[\text{quinoline}]{Pd/BaSO_4} CH_3CHO.$

Here quinoline acts as

A. Catalyst

B. Catalyst poison

C. Promoter

D. Medium

Answer: B

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11. As the size of gold particle increases the colour of solution varies as

A. Purple blue $\rightarrow$ golden $\rightarrow$ red

B. Golden $\rightarrow$ red $\rightarrow$ purple $\rightarrow$ blue

C. Red $\rightarrow$ purple $\rightarrow$ blue $\rightarrow$ golden

D. blue $\rightarrow$ purple $\rightarrow$ golden $\rightarrow$ red

Answer: B

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12. Which one of the following forms a negativity charged sol?

A. $Al_2O_3 . xH_2O$

B. $Cr_2O_3 . xH_2O$

C. TiO_2

D. Cds

Answer: D

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13. Give the order of coagulating power of Cl, SO_4^{2-}, PO_4^{3-} in the coagulation of positive sols.

A. $PO_4^{3-} > SO_4^{2-} > Cl^-$

B. $SO_4^{2-} > Cl^- > PO_4^{3-}$

C. $Cl^- > PO_4^{3-} > SO_4^{2-}$

D. $Cl^- > SO_4^{2-} > PO_4^{3-}$

Answer: A

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PRACTICE EXERCISE

1. The phenomenon of adsorption arises due to unbalanced

A. valence force existing on the surface of solids

B. chemical forces of atoms in the molecules

C. coloumbic forces between electrons and nucleus

D. electrostatic repulsions between the nuclei

Answer: A

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2. According to Freundlich adsorption isotherm, the value of x/m at high pressures is

A. directly proportional to pressure

B. inversely proportional to pressure

C. directly proportional to square of pressure

D. independent of pressure

Answer: D

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3. Which one of the following characteristics is not correct for physical adsorption?

A. Adsorption increases with increases in temperature

B. Adsoption is spontaneous

C. Both enthalpy and entropy of adsorption are negative

D. Adsorption on solids is reversible

Answer: A

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4. Adsorption of gases on solid surface is generally exothermic because (IIT Screening)

A. Enthalpy is $+ve$

B. Entropy decreases

C. Entropy increases

D. Free energy increases

Answer: B

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5. Adsorption is accompanied with

A. decrease in entropy of system

B. decrease in enthalpy

C. the value of $\Delta S.\ T$ is negative

D. all of the above

Answer: D

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6. For a adsorption of gas on solid surface, the plots of log x/m vs. log P is linear with a slope equal to

A. K

B. log K

C. 1/nK

D. 1/n (n being integer)

Answer: D

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7. Which statement is not correct

A. Physical adsorption is due to vander Waals'forces

B. Physical adsorption decreases at high temperature and low pressure

C. Physical adsorption is reversible

D. Adsorption energy for a chemical adsorp tion is generally lesser than that of physical adsorption

Answer: D

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8. Which is correct in case of van der Waals' adsorption?

A. High tempeature, low pressure

B. Low temperature, high pressure

C. Low temperature, low pressure

D. High temperature, high pressure

Answer: B

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9. Rate of physisorption increases with

A. Decrease in temperature

B. Increase in temperature

C. Decrease in pressure

D. Decrease in surface area

Answer: A

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10. Which characteristic is not correct for physical adsorption?

A. Adsorption is spontaneous

B. both enthalpy and entropy change of adsorption are negative

C. Adsorption on solid is reversible

D. Adsorption increases with increase in temperature

Answer: D

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11. Adsorption of a gas on solid metal surface is spontaneous and exothermic, then:

A. H increases

B. AS increases

C. G increases

D. AS decreases

Answer: D

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12. Which is not correct for hetergeneous catalysis?

A. The catalyst decreases the energy of activation

B. The surface of catalyst plays an important role

C. The catalyst actually forms a compound with reactants

D. There is no change in the energy of activation

Answer: D

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13. Which explains the effect of a catalyst on the rate of a reversible reaction?

A. It provides a new reaction path way with a lower activation energy

B. It moves the equilibrium position to the right

C. It increases the kinetic energy of the reacting molecules

D. It decreases the rate of the reverse reaction

Answer: A

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14. $KClO_3$ on heating decomposes into KCl and O_2. If some MnO_2 is added the reaction goes much faster because :

A. MnO_2 decomposes to give oxygen

B. MnO_2 provides heat by reacting

C. better contact is provided by MnO_2

D. MnO_2 acts as a catalyst

Answer: D

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15. Pick up the incorrect statement

A. The rate enzyme catalysed reaction also depends upon enzyme concentration

B. The rate of enzyme cayalysed reaction depends upon ionic strength

C. The rate of enzyme catalysed reaction first increases with temperature and then decreases after attaining optimum temperature

D. The increase in activity of protenin as enzyme is due to denaturation

Answer: B

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16. Which type of metals form effective catalyst?

A. Alkali metals

B. Transition metals

C. alkaline earth metals

D. Radioactive metals

Answer: B

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17. Which process does not involve a catalyst?

A. Haber's process

B. Thermite process

C. Ostwald's process

D. Contact process

Answer: B

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18. A chemical reaction is catalysed by a catalyst hence the catalyst

A. increases the activation energy

B. does not effect the equilibrium constant of a reaction

C. reduces enthalpy of the reaction

D. decreases rate constant of the reaction

Answer: B

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19. The incorrect statement among the following

A. A catalyst does not initiate the reaction

B. The action of catalyst in many instances is selective

C. Catalyst may loose its catalytic activity at high temperature

D. The composition of catalyst changes at the end of reaction

Answer: D

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20. The Brownian motion is due to:

A. temperature fluctuations within the liquid phase

B. attraction and repulsion between charges on the colloidal particles

C. impact of the molecules of the dispersion medium on the colloidal particles

D. convective currents

Answer: C

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21. Which of the following is not shown by sols?

A. Adsorption

B. Tyndall effect

C. Flocculation

D. Paramagnetism

Answer: D

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22. The movement of sol particles under an appled electric field is called:

A. electro deposition

B. electrodialysis

C. electro-osmosis

D. electrophoresis

Answer: D

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23. The average size of the colloids is of the order

A. $10^{-12}M \text{ to } 10^{-19}m$

B. $10^{-7}m \text{ to } 10^{-9}m$

C. $10^{-9}m \text{ to } 10^{-12}m$

D. $10^{-6}m \text{ to } 10^{-9}m$

Answer: B

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24. Smoke is an example of

A. gas dispersed in liquid

B. gas dispersed in solid

C. solid dispersed in gas

D. solid dispersed in solid

Answer: C

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25. Gelatin is often used as an ingredient in the manufacture of ice-cream. The reason for this is

A. to prevent the formation of a colloid

B. to stabilize the colloid and prevent crystal growth

C. to cause the mixture to solidify

D. to improve the flavour

Answer: B

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26. The separation of colloidal particles (or purification of sol) from particles of molecular dimensions is known as

A. photolysis

B. dialysis

C. pyrolysis

D. peptization

Answer: B

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27. The arsenious sulphide sol has negative charge. The maximum coagulating power for precipitating it is of

A. $0.1NZn(NO_3)_2$

B. $0.1NNa_3PO_4$

C. $0.1NZnSO_4$

D. $0.1NAlCl_3$

Answer: D

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28. Which one of the followings is correctly matched ?

A. Emulsion - Curd

B. Foam-Mist

C. Aerosol-Smoke

D. Solid-Cake

Answer: C

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29. Which one of the following methods is commonly used for destruction of colloid ?

A. Dialysis

B. Condensation

C. Filtration by animal membrane

D. By adding electrolyte

Answer: D

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30. Gold numbers of protective colloids A,B, C and D are $0.50, 0.01, 0.10, \text{ and } 0.005$ respectively. The correct order of their protective power is

A. $C > B > D > A$

B. $A > C > B > D$

C. $A > B > C > D$

D. $D > A > C > B$

Answer: B

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31. The property of colloidal suspension used to determine the nature of charge on the particles is (PMT MP)

A. Dialysis

B. Electrophoresis

C. Sedimentation

D. Ultra filtration

Answer: B

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32. The diffusion of particles in colloid is

A. rapid than in true solution

B. slower than in suspension

C. slower than in true solution

D. equal as in true solution

Answer: C

Watch Video Solution

33. Butter is a colloid. It is formed when

A. fat is dispersed in solid casein

B. fat globules are dispersed in water

C. water is dispersed in fat

D. casein is suspended in water

Answer: C

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34. When a colloidal solution is observed under an ultra microscope, we can see

A. light scattered by colloidal particles

B. size of collidal particles

C. shape of the colloidal particles

D. relative size of the colloidal particles

Answer: A

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35. Which one of the following constitues irreversible colloidal system with water as dispersion medium ?

A. Clay

B. Platuinum

C. $Fe(OH)_3$

D. All of thee

Answer: D

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36. Which of the following forms cationic micelles above certain concentrations ?

A. Sodium dodecyl sulphate

B. Urea

C. Sodium acetate

D. Cetyl trimethyl ammonium bromid

Answer: D

Watch Video Solution

37. Cod liver oil is

A. fat dispersed in water

B. water dispersed in fat

C. water dispersed in oil

D. fat dispersed in fat

Answer: C

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38. The colloidal system in which the disperse phase and dispersion medium are both liquids is knows as

A. an emulsion

B. an aerosl

C. a gel

D. a foam

Answer: A

Watch Video Solution

39. Which of the following is characteristic of an oil in water type of emulsion

A. both oil and water are dispersed phases

B. water is dispersed phase

C. both oil and water are dispersion media

D. oil is dispersed phase

Answer: D

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40. Which of the following is an example of zeolite

A. $MgCl_2$

B. $Ca(OH)_2$

C. $ZSM-5$

D. CAN

Answer: C

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41. Soap removes grease by

A. adsorption

B. emulsification

C. coagulation

D. none of these

Answer: B

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42. Which of the following forms micelles in solutions of higher concentrations

A. Sodium carbonate

B. Sodium bicarbonate

C. Potassium acetate

D. Sodium stearate

Answer: D

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43. The cleaning action of soap or detergent is due to

A. lyophilic solution formation

B. emulsification

C. precipitation of dirt

D. lyophobic solution formation

Answer: B

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44. Which is not an example of coagulation

A. Curdling of milk

B. Purification of water by alum

C. Rubber plating and chrome tanning

D. Formation of delta at the river banks

Answer: C

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LEVEL - I (EXERCISE - I)(ADSORPTION)

1. Adsorption is the phenomenon in which a substance

A. accumulates on the surface of other substance

B. goes into the body of the other substance

C. remains close to the other substance

D. does not accumulate on the surface of the other substance

Answer: A

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2. Surface layer of a solid means

A. atoms present in the upperlayer of the solid

B. atoms present upto a depth of 100 nm on the surface

C. atoms present in the bulk of the solid

D. atoms of the surface of a solid not preoccupied by other substances

Answer: B

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3. Charcoal is activated

A. by cooling it from $623^{\circ} C$ to $127^{\circ} C$ in vacuum

B. by cooling it to 23K in vacuum

C. by heating it from 573K to 1273K in vacuum

D. by heating upto 300K

Answer: C

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4. In adsorption of oxalicacid on activated charcoal, the activated charcoal is called

A. adsorbent

B. adsorbate

C. adsorber

D. absorber

Answer: A

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5. Valence forces cause

A. chemisorption

B. Tonic bond

C. sorption

D. adsorption involving multi layers

Answer: A

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6. The bond between the adsorbate and adsorbent in chemisorption is

A. ionic bond

B. covalent bond

C. either ionic or covalent bond

D. Vander waal's forces

Answer: C

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7. The nature of forces operating between the adsorbate and the adsorbent in the adsorption occuring at high temperature is

A. vander wall's forces

B. chemical forces

C. gravitational forces

D. fermi forces

Answer: B

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8. Which of the following statements is true in the case of physical adsorption of gases on solids

A. it is exothermic process

B. it depends on the ease of liquification of the gas

C. it decreases with increase in temperature

D. all the above

Answer: D

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9. Which of the following is chemisorption

A. adsorption of H_2 on Ni at high temperature

B. adsorption of H_2 on charcoal

C. adsorption of moisture on silica gel

D. dehydration by using anhydrous $CaCl_2$

Answer: A

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10. Adsorption is multilayered in case of

A. chemisorption

B. desorption

C. physical adsorption

D. both chemisorption and desorption

Answer: C

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11. Which of the following is not a characteristic of chemisorption

A. It is inversible

B. it is specific

C. it is multi layer phenomenon

D. heat of adsorption is about 40 - 400 KJ

Answer: C

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12. The temperature above which a gas cannot be liquified even on application of high pressure is called

A. boiling point

B. freezing point

C. critical temperature

D. Boyle's temperature

Answer: C

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13. The higher the critical temperature of the gas

A. greater is its extent of adsorption

B. lower is its adsorption

C. lesser is the case of liquification

D. lesser is its volatile nature

Answer: A

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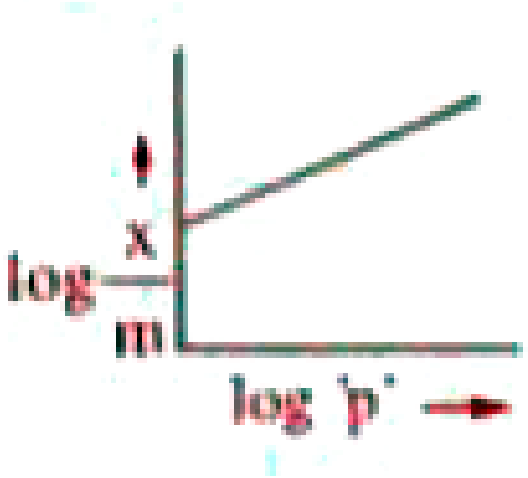
14. Freundlich adsorption isotherm is given by the expression $\frac{x}{m} = kp^{\frac{1}{n}}$.

Then the slope of the line in the following plot is



A. $\sqrt{n}$

B. $1/n$

C. x/m

D. p

Answer: B

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15. The plot of x/m versus temperature at constant pressure is called

A. adsorption isotherm

B. adsorption isobar

C. adsorption isochore

D. Freundlich isotherm

Answer: B

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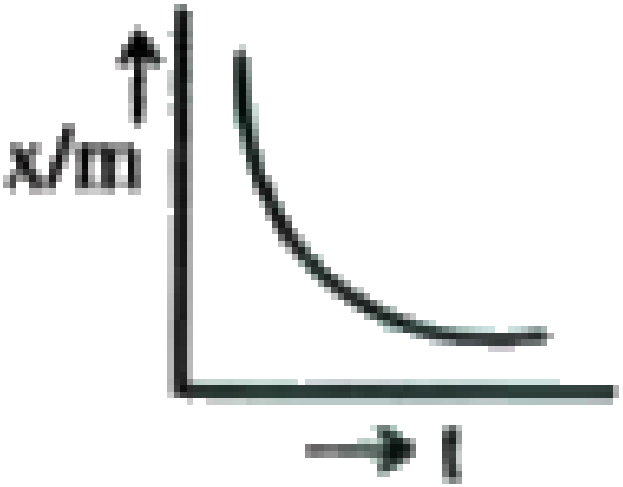
16. The type of adsorption depicted by the adsorption isobar



A. physical

B. Chemical

C. both 1 and 2

D. none of these

Answer: A

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17. Which of the following is adsorbed to a maximum extent on a given amount of adsorbent?

A. H_2

B. N_2

C. O_2

D. SO_2

Answer: D

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18. Which statement is correct about physical adsorption?

A. It is highly specific

B. It is unimolecular layer adsorption

C. It depends on critical temperature of adsorbate

D. It is irreversible

Answer: C

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19. When $0.1MCH_3COOH$ solution is shaken with activated charcoal and the charcoal is filtered out, the concentration of acid -

A. Increases

B. Decreases

C. Remains unchanged

D. Can't say

Answer: B

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20. The phenomenon of simultaneous absorption and adsorption is called

A. Sorption

B. Desorption

C. Chemisorption

D. Absorption

Answer: A

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21. $\frac{x}{m} = KC^{1/n}$ where $C =$ Concentration of a m solution, x = wt of adsorbed solute m =Wt of adsorbent. The equation represents -

A. Langmuir adsorption isotherm

B. Freundlich adsorption isotherm

C. Arrhenius equation

D. Chemisorption isotherm

Answer: B

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22. A graph drawn between $\log\frac{x}{m}$ and logp on 'X' and 'Y' axis respectively could be ___ regarding physical adsorption

A. A hyperbola

B. A parabola

C. A straight line with positive slope

D. A straight line with negative slope

Answer: C

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23. Which of the following is not correct

A. Enthalpy of physical adsorption is less when compared to enthalpy of chemical adsorption

B. Milk is an example of emulsion

C. physical adsorption increases with increase in temparature

D. Smoke is an aerosol

Answer: C

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24. Which of the following can not act as an adsorbent?

A. Silica gel

B. Clay

C. Oxygen gas

D. Activated charcoal

Answer: C

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25. Which can adsorb maximum amount of H_2?

A. A platinum black

B. Powdered palladium

C. A platinum rod

D. Nickel sphere

Answer: B

Watch Video Solution

26. During activation of charcoal -

A. O_2 is adsorbed on charcoal

B. Moisture is absorbed on charcoal

C. Pre adsorbed material is desorbed

D. Charcoal is covered with inert gas

Answer: C

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27. The energy of molecules present on the surface of a substance is -

A. Equal to that of molecules is bulk

B. Greater than that of interior molecules

C. Less than that of interior molecules

D. Dependent on nature of substance

Answer: B

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28. Which of the following is not correct

A. Physical adsorption decreases with the increase in temperature.

B. Physical adsorption is multi layered

C. Activation energy of physical adsorption is very high

D. enthalpy change of physical adsorption is about $20KJmol^{-1}$

Answer: C

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29. The correct combination from the following given statements about chemisorption

I) It is unilayered adsorption

II) It is irreversible and takes place slowly

III) It occurs rapidly

The correct combination is

A. Both I and II are correct

B. Both II and III are correct

C. Both I and III are correct

D. All are correct

Answer: A

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30. The langmuir adsorption isotherm is given by

A. $\frac{x}{m} = -kp^{1/n}$

B. $\frac{x}{m} = \frac{ap}{1+bp}$

C. $\frac{x}{m} - \frac{bp}{a}$

D. $\frac{x}{m} = kp^{n}$

Answer: B

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31. At very high pressure the langmuir adsorption isotherm takes the form of

A. $\frac{x}{m} = kp$

B. $\frac{x}{m} = \frac{a}{b}$

C. $\frac{x}{m} = \frac{1}{1+ap}$

D. $\frac{x}{m} = p$

Answer: B

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32. Based on Langmuir adsorption isotherm, the intercept in the graph $\left(\frac{m}{x}\text{versus}\frac{1}{p}\right)$ is equal to

A. $\frac{1}{a}$

B. $\frac{b}{a}$

C. $\frac{a}{b}$

D. $\frac{a}{\text{slope}}$

Answer: B

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33. The correct statements from the following about physical adsorption

I) desorption of adsorbate gas from adsorbent is not easy since chemical forces are involved

II) Its energy of activation is very low.

III)Easily liquifiable gases are more readily adsorbed.

A. all are correct

B. only (II) and (III)

C. only (I) and (III)

D. only I and II

Answer: B

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34. The following are some statements about adsorption of solutes from the solutions.

A) Increase in the surface area of the adsorbent increases the extent of adsorption.

B) Increase in temperature decreases the extent of adsorption.

C) The extent of adsorption (x/m) is related to the molar concentration of solution (c) is given by $x/m = k.\, c^{1/n}$

The correct combination is

A. only A and C

B. only B and C

C. only A and B

D. all are correct

Answer: D

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35. The following are some statements about physical adsorption

A) involves the weak Vanderwaals interaction between the adsorbate and adsorbent.

B) Involves the chemical interactions between the adsorbent and adsorbate

C) is irreversible in nature

D) It depends upon both nature of adsorbent and adsorbate

The correct combination is

A. all are correct

B. only A and B

C. only A and C

D. only A

Answer: D

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Concentration process	Name of process
A) Hydrogen on finely	1) Physisorption
36. divided palladium	2) Chemisorption
B) Hydrogen on nickel	3) Occlusion
C) Hydrogen on charcoal	4) Desorption

The correct match is

A. $\begin{matrix} A & B & C \\ 1 & 2 & 3 \end{matrix}$

B. $\begin{matrix} A & B & C \\ 3 & 1 & 4 \end{matrix}$

C. $\begin{matrix} A & B & C \\ 3 & 2 & 1 \end{matrix}$

D. $\begin{matrix} A & B & C \\ 4 & 3 & 2 \end{matrix}$

Answer: C

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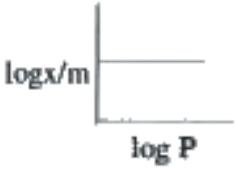
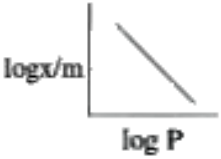
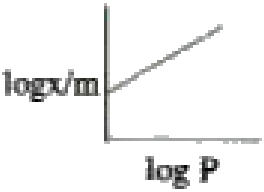
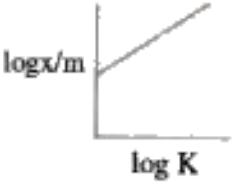
37. Which of the following graph represents Freundlich adsorption isotherm

A. 

B. 

C. 

D. 

Answer: C

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LEVEL - I (EXERCISE - I)(ASSERTION AND REASON TYPE QUESTIONS)

1. (A): Physical adsorption and chemical adsorption are distinguished by adsorption isobars

(R): Physical adsorption is weak while chemical adsorption is strong

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. (A) is false but (R) is true

Answer: B

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2. (A) SO_2 gas is easily liquified while H_2 is difficult to liquify .

(R) SO_2 has low critical temperature while H_2 has high critical temperature.

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. (A) is false but (R) is true

Answer: C

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3. (A): When a finely divided active carbon or clay is stirred into a dilute solution of a dye, the intensity of colour in the solution is decreased.

(R): The dye is adsorbed on the solid surface of carbon or clay

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. (A) is false but (R) is true

Answer: A

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4. (A): Adsorption is a surface phenomenon.

(R) : During adsortion, residual force of surface decreases

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. (A) is false but (R) is true

Answer: B

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5. (A) Physisorption is not specific.

(R) Physisorption involves Vanderwaal's forces only between the adsorbent and adsobate, which are non-specific

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. (A) is false but (R) is true

Answer: A

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6. (A): In chemisorption the adsorbed gas layer is unimolecular thick.

(R): Valence forces exist between the particles of the adsorbent and the adsorbate but not between adsorbate particles among themselves.

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. (A) is false but (R) is true

Answer: A

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LEVEL - I (EXERCISE - I)(COLLOIDS)

1. Which of the following is a crystalloid

A. gum

B. albumin

C. urea

D. glue

Answer: C

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2. Which of the following is not a colloid

A. milk

B. blood

C. ice cream

D. sugar solution

Answer: D

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3. Crystalloid and colloid can be distinguished by

A. diffusion through membrane

B. particle size

C. chemical composition

D. solubility

Answer: A

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4. Colloidal systems are

A. homogeneous

B. heterogeneous

C. suspensions

D. transparent

Answer: B

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5. The number of phases in a colloidal system is

A. 1

B. 2

C. 3

D. 4

Answer: B

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6. Particles of which of the following donot pass through ultra filter paper

A. colloids only

B. true solutions

C. suspensions only

D. colloids and suspension

Answer: D

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7. The tyndall effect in colloidal solutions is due to

A. scattering of light

B. reflection of light

C. absorption of light

D. electrically charge of particles

Answer: A

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8. Which of the following is a homogeneous system?

A. suspension

B. colloid solution

C. true solution

D. starch solution

Answer: C

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9. When dispersed phase is solid and dispersion medium is gas, the colloidal system is

A. smoke

B. clouds

C. emulsion

D. milk

Answer: A

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10. When the dispersion medium is alcohol, the colloidal sol is known as

A. hydrosol

B. benzosol

C. alcosol

D. aquasol

Answer: C

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11. When dispersed phase is liquid and dispersion medium is a solid, the colloid is known as

A. a solution

B. an emulsion

C. a gel

D. a foam

Answer: C

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12. A colloidal solution in which a solid is dispersed in a liquid is called

A. gel

B. emulsion

C. sol

D. precipitate

Answer: C

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13. Blood is a colloidal solution of water containing

A. liquid fat as dispersed phase

B. albuminoid as dispersed phase

C. butter as dispersed phase

D. proteins as dispersed phase

Answer: B

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14. When the dispersed phase has a greater affinity for the dispersion medium, the colloids are termed as

A. lyophilic

B. lyophobic

C. hydrophobic

D. emulsion

Answer: A

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15. The disperse phase, dispersion media, and the nature of colloidal solution of gold sol respectively are

A. Solid, solid, Lyophobic

B. Liquid, liquid, lyophobic

C. Solid, liquid, lyophobic

D. Solid, liquid, lyophillic

Answer: C

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16. The characteristic property of detergent :

A. is it contains both hydrophilic and hydro-phobic groups

B. is it can act as an emulsifier

C. is it enables water and oily substances to form emulsions

D. all the above

Answer: D

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17. The emulsifier for olive oil in water emulsion is

A. soap

B. egg albumin

C. mercuric iodide

D. kerosene

Answer: B

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18. Soap emulsifies

A. oil in water type

B. water in oil type

C. oil in oil type

D. gel in oil

Answer: A

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19. During the cleaning action of soap - part of soap dissolves in the dirt and encapsulates to form micelle

A. both hydrophyllic and hydrophobic

B. hydrophyllic

C. hydrophobic

D. Cation

Answer: C

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20. Water in benzene is emulsified by

A. soap

B. mercuric iodide

C. egg albumin

D. grease

Answer: B

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21. The kind of colloid that does not exist

A. solid in gas

B. gas in solid

C. solid in solid

D. gas in gas

Answer: D

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22. Dispersed phase and the dispersion media in blood respectively are

A. Liquid, solid

B. Liquid, liquid

C. Solid, liquid

D. Solid, solid

Answer: C

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23. The hydrophobic end of lauryl sulphate is

A. $C_{17}H_{35}$

B. $C_{17}H_{33}$

C. C_2H_{25}

D. $-OSO_3-$

Answer: C

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24. Which of the following is not correct

A. Milk is naturally occuring emulsion

B. Gold sol is a lyophilic sol

C. Physical adsorption decreases with rise in temparature

D. Chemical adsorption is unilayered

Answer: B

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25. Which of the following may form associate colloids?

A. Gold

B. Soap

C. Starch

D. Glucose

Answer: B

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26. Which of the following is a lyophobic solution?

A. aqueous starch solution

B. aqueous protein solution

C. gold sol

D. polymer solutions in some organic solvents

Answer: C

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27. Most common emulsifier for vegetable oil, water emulsion is ---

A. Carbon powder

B. Hgl_2

C. Soap

D. Grease

Answer: C

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List - I [Colloidal solution]	List - II [Example]
A) Liquid in gas	1) Milk
B) Solid in gas	2) Paints
C) Liquid in liquid	3) Smoke
D) Solid in liquid	4) Cloud
	5) Gold sol

28.

A. A-4, B-3, C-1, D-2

B. A-2, B-1, C-5, D-4

C. A-4, B-3, C-2, D-5

D. A-1, B-4, C-3, D-2

Answer: A

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29.

LIST - 1	LIST-2
A) Colloidal	1) Liquid or solid or gas
B) Crystalloid	2) $1m\mu - 1\mu$
- 14 C) True solution	3) Does not show Tyndall effect
D) Disperse phase	4) Urea
	5) Either liquid or gas but should not be solid

A. A-2, B-4, C-5, D-3

B. A-2, B-3, C-5, D-1

C. A-5, B-1, C-3, D-2

D. A-2, B-4, C-3, D-1

Answer: D

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30. The simplest way to check whether a system is colloidal

A. Tyndall effect

B. Browmian movement

C. Electrodialysis

D. Finding out particle size

Answer: A

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31. Some statements are given below about lyophillic sol

I) These are solvent hating colloidal solutions

II) These are very stable.

III) All high molecular weight carbon compounds form in water, lyophillic sols.

The correct combination is

A. Both I and II are correct

B. Both II and III are correct

C. Both I and III are correct

D. All are correct

Answer: B

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32. The following are some statements about micelles

I) These are formed as aggregated particles when soap is applied at lower concen trations

II) The tail part of it dissolves the grease deposit or dirt.

III)Hydrocarbon chain of soap micelle is hydrophillic end and its anion part is hydrophobic end.

The correct combination is

A. All are correct

B. Only I and II

C. Only II and III

D. Only II

Answer: D

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33. Colloidal solution of gold prepared by different methods have different colours, because

A. variable valencies of gold

B. difference in the concentration of gold particles

C. impurities produced by different methods

D. difference in the diameter of colloidal gold particles

Answer: D

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34. (A)Milk is a naturally occuring stable emulsion . (R) Milk is an example of oil in water type emulsion

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. (A) is false but (R) is true

Answer: B

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35. (A) Substances whose solutions cannot pass through filter paper are called as colloids.

(R) The size of collidal particles are larger than the size of suspension particles.

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. (A) is false but (R) is true

Answer: C

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36. Gold numbers of protective colloids A,B, C and D are 0.50, 0.01, 0.10, and 0.005 respectively. The correct order of their protective power is

A. C lt B lt D lt A

B. A lt C lt B lt D

C. A lt B lt C lt D

D. D lt A lt C lt B

Answer: B

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LEVEL - I (EXERCISE - I)(CATALYSIS)

1. A catalyst

A. increases the average kinetic energy of reacting molecules

B. increases the activation energy

C. alters the reaction mechanism

D. increases the frequency of collisions of reacting species

Answer: C

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2. The rate of a chemical reaction is increased in presence of a catalyst. This is because

A. activation energy of the reaction is less in the new path

B. heat of reaction is decreased

C. threshold energy is increased

D. activation energy of the new path is more

Answer: A

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3. An inhibitor is essentially

A. a negative catalyst

B. an auto catalyst

C. a homogeneous catalyst

D. a heterogeneous catalyst

Answer: A

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4. Which of the following kind of catalysis can be explained by the adsorption theory?

A. Homogeneous catalysis

B. Acid - base catalysis

C. Heterogeneous catalysis

D. Auto catalysis

Answer: C

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5. Which of the following processes does not involve a catalyst

A. Haber's process

B. Thermit process

C. Ostwald's process

D. Contact process

Answer: B

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6. The catalyst used in the dehydration of ethylalcohol to ethene is

A. Al_2O_3

B. Sb_2O_3

C. As_2O_3

D. Cu

Answer: A

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7. In heterogeneous catalytic reactions, catalyst in the finely divided form possesses higher catalytic reactivity. This is because

A. surface area of the finely divided catalyst is large

B. surface area of the catalyst in the lump form is large

C. finely divided catalyst has more internal energy in it

D. finely divided catalyst has stable surface

Answer: A

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8. When an acid solution of oxalic acid at $80^{\circ}C$ is titrated with $KMnO_4$ solution, the first few drops of $KMnO_4$ are decoloured slowly but decolourisation occurs fast later. This is because

A. of increase in the concentration of CO_2 formed

B. one of the products Mn^{+2} acts as auto catalyst

C. both Mn^{2+} and K^{+} ions act as auto catalyst

D. $KMnO_4$ catalyses the reaction at the later stages

Answer: B

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9. In heterogeneous catalytic reactions involving solid catalyst and gaseous reactants, the catalysts, most generally used are

A. metals

B. metal oxides only

C. transition metals only

D. transition metals and transition metal oxides

Answer: D

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10. The process which is catalysed by one of the products is called

A. Acid - base catalysis

B. Auto catalysis

C. Negative catalysis

D. Positive catalysis

Answer: B

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11. Which of the following reactions is an example of heterogeneous catalysis

A. $2CO(g) + O_2(g) \xrightarrow{NO(g)} 2CO_2(g)$

B. $2SO_2(g) + O_2(g) \xrightarrow{NO(g)} 2SO_3(g)$

C. $2CO(g) + O_2g \rightarrow \xrightarrow{Pt(s)} 2CO_2(g)$

D. $CH_3CHO(g) \xrightarrow{I_2(g)} CH_4(g) + CO(g)$

Answer: C

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12. The catalyst used to increase the dissociation of H_2O_2 is

A. Acetanilide

B. Glycerol

C. H_3PO_4

D. Caustic soda

Answer: D

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13. A catalyst increases the rate of a reaction with out changing _____

A. energy of activation

B. Heat of the reaction

C. Path of reaction

D. Mechanism of reaction

Answer: B

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14. Catalytic action of an enzyme is

A. Highly specific

B. Non specific

C. Does not depend on nature of substrate

D. Common for many biochemical reactions

Answer: A

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15. Which of the following catalyst is used for preparing toluene by reacting benzene with methyl chloride ?

A. Ni

B. Anhydrous $AICI_3$

C. Pd

D. Pt

Answer: B

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16. In which of these processes platinum is used as a catalyst ?

A. Oxidation of ammonia to form HNO_3

B. Hardening of oils

C. Production of synthetic rubber

D. Synthesis of methanol

Answer: A

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17. A biological catalyst is

A. An amino acid

B. A carbohydrate

C. The nitrogen molecule

D. An enzyme

Answer: D

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18. Which of the following is an example of a heterogeneous catalytic reaction

A. $2SO_{2(g)} + O_{2(g)} \xrightarrow{NO(g)} 2SO_{3(g)}$

B. Hydrolysis of an aqueous solution of sugar in presence of a mineral acid

C. $2H_2O_{2(l)} \xrightarrow{Pt(s)} 2H_2O_l + O_{2(g)}$

D. Hydrolysis of liquid ester in the presence of aqueous mineral acid

Answer: C

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19. Which of the following is correct

A. Catalyst undergoes permanent chemical change

B. Particle size of solute in a true solution is $10^{-3}m$

C. Starch solution is a hydrosol

D. Hydrolysis of liquid ester in the presence of a mineral acid is an example of a leterogeneous catalytic reaction

Answer: C

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20.

LIST - 1	LIST - 2
A) Positive catalyst	1) H_2S to iron in Habers process
B) Negative catalyst	2) 'CO' to preparation of SO_3
C) Catalytic poison	3) Glycerol to prevent decomposition of H_2O_2
D) Promoter	4) MnO_2 in the decomposition of $KClO_3$
	5) Mo to Fe in Habers process

The correct match is

A.

A	B	C	D
4	3	5	2

B.

A	B	C	D
3	4	2	1

C.

A	B	C	D
4	3	1	5

D.

A	B	C	D
1	5	3	2

Answer: C

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21.

Name of reaction	Catalyst
A) Hydrogenation of oils	1) Fe
B) Oxidation of CO	2) N i
C) Contact's process	3) V_2O_3
D) Haber's process	4) Mo
	5) NO

The correct match is

A.

A	B	C	D
2	5	1	4

B.

A	B	C	D
2	3	4	1

C.

A	B	C	D
3	5	4	2

D.

A	B	C	D
2	5	3	1

Answer: D

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22. The following are some statements about characteristics of catalyst

I) A catalyst generally function under the optimum conditions like pH, temperature

II) A catalyst has a selective action

III) Small amount of the catalyst is sufficient

The correct combination is

A. All are correct

B. Only I and II

C. Only II and III

D. Only II

Answer: A

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23. (A)Same reactants give different products with different catalysts.

(R) Catalyst is highly specific or selective.

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24. (A): A reaction cannot become fast by itself unless a catalyst is added.

(R): A catalyst always increases the speed of a reaction.

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25. Which of the following is an example for auto catalysis

A. $2AsH_{3(g)} \rightarrow 2As_s + 3H_{2(g)}$

B. $N_{2(g)} + N_{2(g)} + 3H_{2(g)} \rightarrow 2NH_{3(g)}$

C. $2SO_{2(g)} + O_{2(g)} \rightarrow 2SO_{3(g)}$

D. $C_{12}H_{12}O_{11(l)} + H_2O_{(l)} \rightarrow C_6H_{12}O_{6(l)} + C_6H_{12}O_{6(l)}$

Answer: A

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LEVEL - I (EXERCISE - II)(ADSORPTION)

1. The phenomenon of adsorption arises due to unbalanced

A. valence force existing on the surface of solids

B. chemical forces of atoms in the molecules

C. coloumbic forces between electrons and nucleus

D. electrostatic repulsions between the nuclei

Answer: A

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2. Which of the following gases is adsorbed easily and more on activated charcoal

A. $CO_2(T_c = 304K)$

B. $SO_2(T_c = 430K)$

C. $H_2(T_c 23K)$

D. all gases undergo adsorption to the same extent

Answer: B

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3. According to Freundlich adsorption isotherm, at high pressure, value of x/m is

A. directly proportional to pressure

B. inversely proportional to pressure

C. directly proportional to square of pressure

D. independent of pressure

Answer: D

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4. Adsorption isotherm of gases on solids give the relation between

A. volume of adsorbent and temperature

B. amount of adsorbent per unit weight of adsorbate and pressure

C. amount of adsorbate per unit weight of adsorbent and equilibrium pressure

D. volume of adsorbate and pressure

Answer: C

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5. Which one of the following characteristics is not correct for physical adsorption?

A. Adsorption increases with increases in temperature

B. Adsorption is spontaneous

C. Both enthalpy and entropy of adsorption are -ve

D. Activation energy is slow

Answer: A

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6. Amount of gas adsorbed per gram of adsorbent increases with pressure but after certain limit is reached, adsorption becomes constant. It is when

A. multi layers are formed

B. desorption takes place

C. temperature is increased

D. absorption also starts

Answer: A

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7. Favourable conditions for physical adsorption are

A. low T, high P

B. high T, high P

C. low T, low P

D. low T, low P

Answer: A

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LEVEL - I (EXERCISE - II)(COLLOIDS)

1. The diffusion of particles in colloid is

A. rapid than in true solution

B. slower than in suspension

C. slower than in true solution

D. equal as in true solution

Answer: C

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2. Smoke, cloud and gold sol are respectively

A. Aerosol, Hydrosol and Aquasol

B. Hydrosol, Hydrosol and Hydrosol

C. Aquasol, Aerosol and Hydrosol

D. Aerosol, Aerosol and Hydrosol

Answer: D

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3. Butter is a colloid. It is formed when

A. fat is dispersed in solid casein

B. fat globules are dispersed in water

C. water is dispersed in fat

D. casein is suspended in water

Answer: C

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4. In colloidal state particle size ranges from

A. $1 - 10Å$

B. $20 - 50Å$

C. $10 - 1000Å$

D. $1 - 280Å$

Answer: C

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5. When a colloidal solution is observed under an ultra microscope, we can see

A. light scattered by colloidal particles

B. size of collidal particles

C. shape of the colloidal particles

D. relative size of the colloidal particles

Answer: A

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6. Which of the following is a non electrolytic colloidal sol

A. Starch

B. AgCl sol

C. Arsenic sulphide sol

D. $Sb_2S_3 sol$

Answer: A

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7. Which of the following forms micelles in solutions of higher concentrations

A. Sodium carbonate

B. Sodium bicarbonate

C. Potassium acetate

D. Sodium stearate

Answer: D

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8. A substance which forms micelles in solutions contains

A. carboxylic group

B. alkyl group

C. water insoluble long hydrocarbon groups and water soluble polar groups

D. water soluble hydrocarbon group and water insoluble polar group

Answer: C

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9. The cleaning action of soap or detergent is due to

A. lyophilic solution formation

B. emulsification

C. precipitation of dirt

D. lyophobic solution formation

Answer: B

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10. Sodium stearate forms associated colloids

A. due to association of Nations

B. due to dissociation of stearate ion

C. due to orientation of hydrocarbon chain towards centre of the micelle and COO^-) groups towards water

D. due to orientation of COO^- groups towards center of the micelle and hydrocarbon chain towards water

Answer: C

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11. Which of the following is characteristic of an oil in water type of emulsion

A. both oil and water are dispersed phases

B. water is dispersed phase

C. both oil and water are dispersion media

D. Oil is dispersed phase

Answer: D

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12. In Faraday-Tyndall effect the colloidally suspended particles

A. trace out the path of strong beam of light

B. coagulate

C. show electrophoresis

D. show brownian movement

Answer: A

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13. Which one of the following constitues irreversible colloidal system with water as dispersion medium ?

A. Clay

B. Platinum

C. $Fe(OH)_3$

D. All of three

Answer: D

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14. Which of the following form micellies in aqueous solution above critical concentration

A. Glucose

B. Urea

C. Dodecyl trimethyl ammonium chloride

D. Pyridinium chloride

Answer: C

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15. Which of the following in an emulsion?

A. Butter

B. Hair cream

C. Milk

D. Cloud

Answer: D

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LEVEL - I (EXERCISE - II)(CATALYSIS)

1. A chemical reaction is catalysed by a catalyst hence the catalyst

A. increases the activation energy

B. does not effect the equilibrium constant of reaction

C. reduces enthalpy of the reaction

D. decreases rate constant of the reaction

Answer: B

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2. $CH_3COCl + H_2 \xrightarrow[\text{quinoline}]{Pd\,/\,BaSO_4} CH_3CHO.$

Here quinoline acts as

A. $+ve$ catalyst

B. Catalyst poison

C. Promoter

D. Medium

Answer: B

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3. The incorrect statement among the following

A. A catalyst does not initiate the reaction

B. The action of catalyst in many instances is selective

C. Catalyst may loose its catalytic activity at high temperature

D. The composition of catalyst changes at the end of reaction

Answer: D

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LEVEL - II (LECTURE SHEET) (EXERCISE - I)(SINGLE & ONE OR MORE THAN ONE CORRECT ANSWERS)

1. Which of the following is not considered as absorption

A. chalk piece dipped in ink

B. sponge placed in water

C. finely divided charcoal stirred with dilute acetic acid

D. H_2, gas in contact with finely divided Pd

Answer: C::D

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2. Insecticide sprays are example of

A. Liquid in gas

B. Gas in liquid

C. Gas in solid

D. Solid in liquid

Answer: A

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3. Bredig's arc method is used for the preparation of colloidal solution of

A. Organic compounds

B. metals like silver, gold etc

C. two liquids

D. inorganic compounds

Answer: B

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4. When freshly precipitated $Fe(OH)_3$ is boiled with water in the presence of few drops of dil HCl, a hydrated ferric oxide sol is obtained. This method is termed

A. Dialysis

B. Peptization

C. ultrafiltration

D. Electro dispersion

Answer: B

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5. The migration of positively charged colloidal particles, under an electrical field towards the cathode is called

A. cataphoresis

B. Electro-Osmosis

C. sedimentation

D. Electrodialysis

Answer: A

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6. If a freshly formed ppt of SnO_2 is peptised by a small amount of $NaOH$, these colloidal particles may be represented as

A. $[SnO_2]SnO_3^{2-} : Na^+$

B. $[SnO_2]Sn^{4+} : O^{2-}$

C. $[SnO_2]Na^+ : OH^-$

D. $[SnO_2]Sn^{4+} : OH^-$

Answer: A

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7. On adding $AgNO_3$ solution to KI solution, a negatively charged colloidal sol will be formed in which of the following conditions ?

A. $100ml \text{ of } 0.1MAgNO_3 + 100ml \text{ of } 0.1MKI$

B. $100ml \text{ of } 0.1MAgNO_3 + 100ml \text{ of } 0.2MKI$

C. $100ml \text{ of } 0.2MAgNO_3 + 100ml \text{ of } 0.1MKI$

D. $100ml \text{ of } 0.15MAgNO_3 + 100ml \text{ of } 0.15MKI$

Answer: B

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8. Chromatography is a technique based on

A. adsorption and then dispersion of solute

B. adsorbent's ability for preferential adsorption

C. hydration of solute

D. evaporation of solute

Answer: A::B

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9. Arsenous sulphide sol is prepared by passing H_2S through asenous oxide solution the charge developed on the particles is due to adsorption of

A. H^+

B. S^{-2}

C. OH^-

D. O^{-2}

Answer: B

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10. Tyndall effect observed only when

A. Diameter of dispersed particles is greater than the wavelength of the light

B. Diameter of dispersed particles is lower than the wavelength of the light

C. The refractive indicies of dispersed medium & phase are different

D. The refractive indicies of dispersed medium & phase are same

Answer: A::C

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11. When lyophillic sols like starch is placed in electric field the sol particle will move

A. neither towards anode nor cathode at iso-electric point

B. towards cathode at p^H less than that of isoelectric point

C. towards Anode at p^H more than that of isoelectric point

D. Simultaneously towards anode & cathode with equal velocity

Answer: A::B::C

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12. An emulsifier is an agent which

A. Acceleration the dispersion

B. homogenies an emulsion.

C. stabilises an emulsion

D. Aids the floculation of an emulsion

Answer: B::C

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13. Oil soluble dye is mixed with water - in - oil emulsion then

A. dispersion meidum is coloured

B. disperssed phase is coloured

C. Both (a) and (b)

D. None of these

Answer: A

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14. Oil soluble dye is mixed with emulsion and emulsion remains colourless then it is

A. 0-in-W

B. W-in-O

C. O-in-o

D. W-in-W

Answer: A

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15. Non - ionogenic surfactants are

A. 

B. $C_{17}H_{35}COONa$

C. $C_nH_{2n+1}(OCH_2CH_b)_xOH$

D. 

Answer: C::D

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16. Select correct properties of emulsions

A. emulsions exhibit Tyndall effect

B. Oil emulsions are more viscous than the aqueous emulsions

C. Electrical conductance of aqueous emulsion is higher than that of oil emulsion

D. emulsion exhibits brownian movement

Answer: A::B::C::D

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17. At CMC

A. Osmotic pressure changes

B. Surface tension always decreases

C. The $\Delta H$is highly negative

D. association of particles takes place

Answer: A::B::D

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18. Above CMC, the surfactant molecules under go

A. dissociation

B. Aggregation

C. Micelle formation

D. All of these

Answer: B::C

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19. Which of the following is true in respect of adsorption

A. $\Delta G < O, \Delta S > O, \Delta H < O$

B. $\Delta\ G < O, \Delta S < O, \Delta H < O$

C. $\Delta G < O, \Delta S > O, \Delta H < O$

D. $\Delta G\ < O, \Delta S < O, \Delta H > O$

Answer: B

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20. In the adsorption of acetic acid by charcoal which of the following statements are correct ?

A. Charcoal is called adsorbent

B. Concentration of acetic acid decreases

C. Concentration of acetic acid increases

D. Acetic acid is adsorbate

Answer: A::B::D

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21. Calculate the surface area of a catalyst that adsorbs $10^3 cm^3$ of N_2 (reduced to STP) per gram in order to form the monolayer. The effective area occupied by N_2 molecule on the surface is $1.62 \times 10^5 cm^2$

A. $2520x10^5 cm^2$

B. $4350m^2$

C. $3720m^2$

D. $435 \times 10^5 cm^2$

Answer: B::D

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22. In Langmuir's model of adsorption of a gas on a solid surface

A. The mass of gas striking a given area of surface is propotional to the pressure of the gas

B. The mass of gas striking a given area of surface is independent of the pressure of the gas

C. The rate of dissociation of adsorbed molecules from the surface does not depend on the surface covered

D. The adsorption at a single site on the surface may involve multiple molecules at the same time

Answer: A

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23. Bredig arc method cannot be used to prepare colloidal solution of which of the following

A. Pt

B. Fe

C. Ag

D. O_2

Answer: D

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24. Assosiated colloids

A. raise the surface tension of water

B. lower the surface tension of water

C. rise the viscosity of water

D. lower the viscosity of water

Answer: B::C

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25. The gold number of some colloids are given below

Colloid	Gold number
A	0.01
B	2.5
C	20

The protective nature of these colloids follows the order

A. $C > B > A$

B. $A > B > C$

C. $A = B = C$

D. $B > A > C$

Answer: B

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26. Artificial rain is caused by spray of

A. electrified sand

B. charged silver sols

C. negatively charged sand or salt

D. positively charged sand or salt

Answer: A::B::D

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27. Which one is an example of micelle system

A. Soap + Water

B. Protein + Water

C. Rubber + Benzene

D. $As_2O_3 + Fe(OH)_3$

Answer: A

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28. Which statement is correct ?

A. All the soaps are surfactants

B. Detergents posses cleaning action in addition to surface activity

C. All the surfactants are detergents

D. Surfactants posses surface activity

Answer: A::B::D

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29. Emulsifiers are generally

A. Soap

B. Synthetic detergents

C. Lyophilic sols

D. None of these

Answer: A::B::C

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30. According produces to the adsorption theory of catalysis, the speed of the reaction increases because

A. The concentration of the reactant molecules at the active centres of the catalyst becomes high due to adsorption

B. In the process of adsorption, the activation energy of the molecules becomes large

C. Adsorption produces heat which increases the speed of reaction

D. Adsoption lowers the activation energy of the reaction

Answer: D

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31. Following are the events taking place to explain adsorption theory

I : Desorption

II : Diffusion of the reactants along the surface

III : adsorption of the reactants

IV : formation of the activated surface complex

These events are taking place in the following order

A. I, II, III, IV

B. II, III, IV, I

C. III, IV, I, II

D. IV, III, II, I

Answer: B

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32. The effeciency of an enzyme in catalysing a reaction is due to its capacity

A. To form an enzyme - substrate complex

B. To decrease the bond energies of the substrate molecule

C. To change the shape of the substrate molecule

D. None of the above

Answer: A

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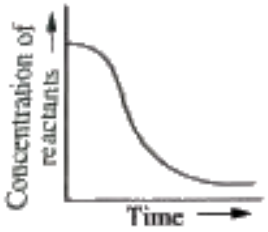
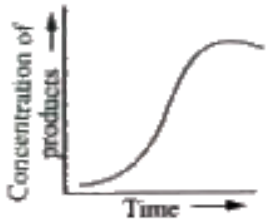
33. In the reaction of autocatalysis, the variation of concentration with time is correctly represented by which of the following plots?

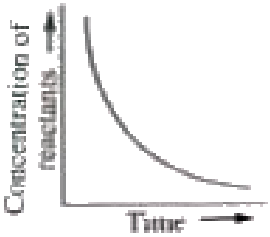
A.



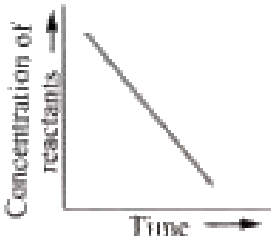
B.



C.



D.



Answer: A::B

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34. Zeolites are

A. Water softeners

B. Catalysts

C. Complex nitrogen compounds

D. Inorganic sulphides

Answer: A::B

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35. The activity and selectivity of zeolites as catalysts is based on

A. Their pore size

B. size of their cavities on the surface

C. Muta rotation

D. None of the above

Answer: A::B

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36. Which one of the following statements about zeolite is true

A. They are used as cation exchangers

B. They have structure which enables then to take up small molecules

C. Zeolites are aluminosilicates having three dimensional network

D. Some of the SiO_4^{4-} units are replaced by AlO_4^{5-} and AlO_6^{9-} ions in zeolites

Answer: A::B::C

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37. The correct statement(s) to the adsorption of a gas on a solid surface is (are)

A. Adsorption is always exothermic

B. Physisorption may transform into chemisorption at high temperature

C. Physisorption increases with increasing temperature but chemisorption decreases with increasing temperature

D. Chemisorption is more exothermic than physisorption, however it is very slow due to higher energy of activation

Answer: A::B::D

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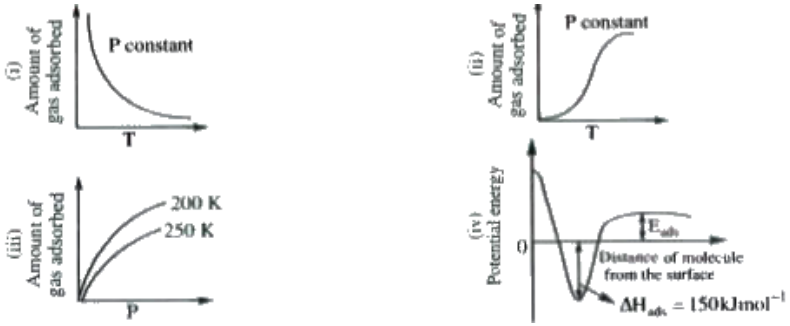
38. The given graph/data I, II, III and IV represent general trends for different physisorption and chemisorption processes under mild conditions of temperature and pressure. Which of the following choice (s) about I, II, III and IV is (are) correct



A. I is physisorption and II is chemisorption

B. I is physisorption and III is chemisorption

C. IV is chemisorption and II is chemisorption

D. IV is chemisorption and III is chemisorption

Answer: A::C

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39. Choose the correct reason(s) for the stability of the lyophobic colloidal particles

A. Preferential adsorption of ions on their surface from the solution

B. Preferential adsorption of solvent on their surface from the solution

C. Attraction between different particles having opposite charges on their surface.

D. Potential difference between the fixed layer and the diffused layer of opposite charges around the colloidal particles.

Answer: A::D

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LEVEL - II (LECTURE SHEET) (EXERCISE - II)(LINKED COMPREHENSION TYPE QUESTIONS)

1. Following passage describes charcterstics of colloids. Answer the questions at the end of it. Lyophilic colloidal sols are much more stable than lyophobic colloidal sols. This is due to the extensive solvation of lyophilic colloidal sols, which forms a protective layer outside it and thus prevents it from forming associated colloids.

Lyophillic colloidal sols also protect lyophobic colloidal sols from precipition by the action of electrolytes. This is due to formation of a protective layer by lyophilic sols outside lyophobic sols. Lyophilic colloidal sols are called protective sols. Gelatin (lyophilic) protects gold sol (lyophobic) from coagulaion on the addition of sodium chloride solution. Protective powers of different colloidal sols are measured in terms of 'gold number' (Zigmody). It is defined as the amount of protective sol in milligrams that prevents the coagulation of 10 mL of a given gold sol on adding 1 mL of 10 percent sodium chloride. Thus smaller the gold number of a lyophillic sol, the greater is the protective power.

0.025g of starch sol is required to prevent coagulation of 10ml gold sol

when ImL of 10% Nacl solution is present. What is gold number of starch sol

A. 0.025

B. 2.5×10^{-5}

C. 0.25

D. 25

Answer: D

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2. Following passage describes charcterstics of colloids. Answer the questions at the end of it. Lyophilic colloidal sols are much more stable than lyophobic colloidal sols. This is due to the extensive solvation of lyophilic colloidal sols, which forms a protective layer outside it and thus prevents it from forming associated colloids.

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Gold number of haemoglobin is 0.03. Hence, 10 mL of gold sol will require haemoglobin so that gold is not coagulated by ImL of 10% NaCl solution

A. 0.03 mg

B. 30 mg

C. 0.30 mg

D. 3 mg

Answer: A

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3. Following passage describes charcterstics of colloids. Answer the questions at the end of it. Lyophilic colloidal sols are much more stable than lyophobic colloidal sols. This is due to the extensive solvation of lyophilic colloidal sols, which forms a protective layer outside it and thus prevents it from forming associated colloids.

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$[AgI]I^-$ collodial sol can be coagulated by the addition of a suitable cation. 1 mol of $[Agl]I^-$ requires mol of $AgNO_3, Pb(NO_3)_2$ and $Fe(NO_3)_3$ as

A. $1, 1, 1$

B. $1, 2, 3$

C. $1, \frac{1}{2}, \frac{1}{3}$

D. $6, 3, 2$

Answer: C::D

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4. There are certain substances which behave as normal, strong electrolytes at low concentration but at higher concentration they behave as colloidal solution due to the formation of aggregated particles. Such colloids are called associated colloids and the aggregated particles are called micelles. Soaps anddetergents are the examples of associated colloids. The formation of micelles takes place above certain concentration called critical micellization concentration (CMC) and a characteristic temperature called Kraft temperature (T_k).

What type of molecules form micelles

A. Non - polar molecules

B. electrolytes such as NaCl

C. Surfactant molecules

D. Salt of weak acid and weak base

Answer: C::D

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5. There are certain substances which behave as normal, strong electrolytes at low concentration but at higher concentration they behave as colloidal solution due to the formation of aggregated particles. Such colloids are called associated colloids and the aggregated particles are called micelles. Soaps anddetergents are the examples of associated colloids. The formation of micelles takes place above certain concentration called critical micellization concentration (CMC) and a characteristic temperature called Kraft temperature (T_k).

Micelles are formed only

A. below the CMC

B. above the CMC

C. above the 1M concentration

D. below IM Concentration

Answer: B

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LEVEL - II (LECTURE SHEET) (EXERCISE - III)(MATCH THE FOLLOWING QUESTIONS)

	Column - I	Column - II
	A) Coagulation	p) Scatering of light
1.	B) Peptization	q) Purification of colloidal solution
	C) Tyndall effect	r) Addition of electrolyte
	D) Dialysis	s) Precipitation of colloidal solution

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	Column - I	Column - II
	A)Emulsifier	p) Colloidal solution of graphite
2.	B) Colloidal electrolyte	q) Detergent
	C) ZSM - 5	r) $H_x\left[(AlO_2)_x(SiO_2)_{96-x}\right]16H_2O$
	D) Glycerol	s) decomposition ofH_2O_2

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	Column - I	Column - II
	A) Milk	p) Aerosol
3.	B) Dust	q) Emulsion
	C) Cheese	r) Gel
	D) Froth	s) Foam

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LEVEL - II (LECTURE SHEET) (EXERCISE - IV)(INTEGER ANSWER TYPE QUESTIONS)

1. One gram of charcoal adsorbs 100 ml of $0.5MCH_3COOH$ & then molarity of acetic acid reduces to 0.49 M. The no. of milli moles of acetic acid adsorbed is _____

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2. How many colloidal systems exist in nature ?

Watch Video Solution

3. How many colloidal systems exist in nature with gas as dispersed phase ?

Watch Video Solution

4. The coagulation of 100 ml gold sol is completely prevented by adding 0.25 g of starch to it before adding 10 ml of 10% NaCl solution. Calculate the gold number of starch.

Watch Video Solution

PRACTICE SHEET - 1 (SINGE OR MORE THAN ONE OPTION QUESTIONS)

1. A colloidal solution is subjected to an electrical field. The particles move towards anode. The coagulation of same sol is studied using NaCl, $BaCl_2$ and AIC_3 solutions. Their coagulating power should be

A. Na_3PO_4

B. Na_2SO_4

C. $NaCl$

D. Same for all

Answer: C::D

Watch Video Solution

2. Adsorption of gases on solid surface is generally exothermic because (IIT Screening)

A. Enthalpy is positive

B. Entorpy decreases

C. Entropy increases

D. free energy increases

Answer: B

Watch Video Solution

3. Equal volume each of two sols of AgI one obtained by adding $AgNO_3$ to slight excess of KI and another obtained by adding KI to slight excess of $AgNO_3$ are mixed together then

A. The sols will coagulate each other mutually

B. The two sols will stabilize each other

C. The sol particles will acquire more electric charge

D. A true solution will be obtained

Answer: A

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4. $1.30 Lit N_2$ gas at 2atm and 300K in a container is exposed to 4g of solid surface. After complete adsorption the pressure of N_2 is reduced by 30% calculate the value of x/m

A. 0.22

B. 0.56

C. 0.32

D. 0.43

Answer: A

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5. 3.6gr of O_2 is adsorbed on 1.2gr of metal powder what volume of O_2 adsorbed per gram of the adsorbent at latm and 273K

A. 2.1

B. 0.19

C. 1

D. None

Answer: A

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6. Which among the following statements are correct with respect to adsorption of gases on a solid

A. The extent of adsorption is equal to kp^{2n} according to Freundlich isotherm.

B. The extent of adsorption is equal to $kp^{1/n}$ according to Freundlich isotherm.

C. The extent of adsorption is equal to $\frac{1+bp}{ap}$ according to langmuir isotherm

D. Freundlich adsorption isotherm fails at low pressure

Answer: B

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7. Graph between $\log\left(\frac{x}{m}\right)$ and log p is a st. line at angle 45° with intercept as shown in Fig. Hence $\left(\frac{x}{m}\right)$ at a pressure of 0.2 atm is

A. 0.2

B. 0.4

C. 0.6

D. 0.8

Answer: B

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8. The following data were obtained for the adsorption of CO on 3g of charcoal at $0^\circ C$

Pressure, p(mm)	180	540
$\text{Volume of gas adsorbed x(cc) (reduced to STP)}$	16.5	38.1

Calculate the value of the constants K and n used in Freundlich equation

A. $n = 2.32, k = 0.342 cm^3/g$

B. $n = 3.3, 1k = 0.272 cm^3/g$

C. $n = 1.31, k = 0.104 cm^3/g$

D. $n = 4.32, k = 0.40 cm^3/g$

Answer: C::D

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Watch Video Solution

9. The conversion of Maltose to Glucose is possible by the enzyme

A. Zymase

B. Lactase

C. Diastase

D. Maltase

Answer: D

Watch Video Solution

10. Number of moles of $[NH_4OH]$ required to coagulate 1mole of $[Fe(OH)_3]Fe^{+3}$ are

A. 3

B. 4

C. 2

D. 1

Answer: A

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11. Which of the following is represented by sols

A. Adsorption

B. Tyndal effect

C. Flocculation

D. Paramagnetism

Answer: A::B::C

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12. Which of the following are correct

A. silica gel adsorbs H_2O

B. $CaCl_2$ (anhy) adsorbs H_2O

C. Gas masks work on the principle of selective adsorption

D. Zeolites are shape selective catalyst and water softners

Answer: A::C::D

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13. Which of the following give linear plots

A. $\log\frac{x}{m}\text{versus }\log C$

B. $\log\frac{x}{m}\text{versus}\frac{1}{p}$

C. $\frac{m}{x}\text{versus}\frac{1}{p}$

D. $p/\left(\frac{x}{m}\right)\text{versus}P$

Answer: A::C::D

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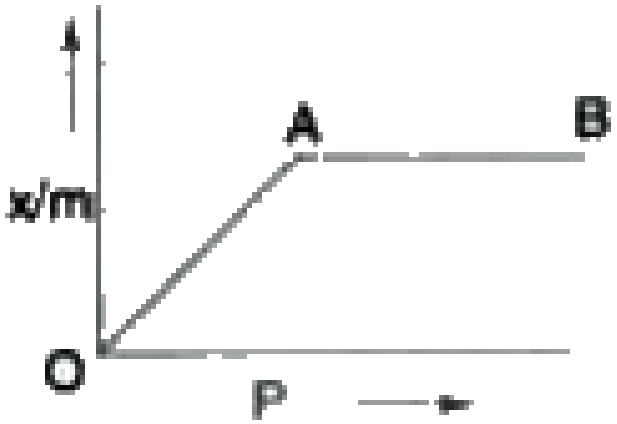
14. In the following isotherm (Fig)



A. $\frac{x}{m}\alpha P^{\circ}$ When point B is reached

B. Desorption may start along AB

C. $\frac{x}{m}\alpha p^{1/n}$ along OA

D. $\frac{x}{m}\alpha P$ when point B is reached

Answer: A::B::C

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15. Select the properties which are for lyophilic colloidal sols

A. Viscosity same as that of the medium

B. Extensive hydration takes place

C. Particles migrate either towards cathode or anode in an electric field

D. Particles cannot be detected even under ultramicroscopes

Answer: A::B

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16. Colloidal gold can be prepared by

A. reduction of $AuCl_3$

B. Bredig's are method

C. hydrolsis

D. Peptization

Answer: A::B

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PRACTICE SHEET - 1 (LINKED COMPREHENSION TYPE QUESTIONS)

1. Only the surface atoms in an adsorbent, play an active role in adsorption. These atoms posses some residual forces like vander Waal's forces and chemical forces. In the process of adsorption, weak adsorbate is substituted by strong adsorbate. Activated charcoal used in gas mask is already exposed to the atmospheric air, so the gases and water vapours in air are adsorbed on its surface. When the mask is exposed to chlorine atmosphere, the gases are displaced by chlorine. Porous and finely powdered solids, e.g., charcoal and Fuller's earth adsorb more as compared to the hard non-porous material. It is due to this property that

the powdered charcoal is used in gas masks. In general, easily liquefiable gases like CO_2, NH_3, Cl_2, and SO_2 etc., are adsorbed to a greater extent than the elemental gases, eg., H_2, N_2, O_2, He, etc.

Which of the following gases will be most easily adsorbed by the charcoal in the gas mask

A. H_2

B. O_2

C. N_2

D. SO_2

Answer: D

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2. Only the surface atoms in an adsorbent, play an active role in adsorption. These atoms posses some residual forces like vander Waal's forces and chemical forces. In the process of adsorption, weak adsorbate is substituted by strong adsorbate. Activated charcoal used in gas mask is

already exposed to the atmospheric air, so the gases and water vapours in air are adsorbed on its surface. When the mask is exposed to chlorine atmosphere, the gases are displaced by chlorine. Porous and finely powdered solids, e.g., charcoal and Fuller's earth adsorb more as compared to the hard non-porous material. It is due to this property that the powdered characoal is used in gas masks. In general, easily liquefiable gases like CO_2, NH_3, Cl_2, and SO_2 etc., are adsorbed to a greater extent than the elemental gases, eg., H_2, N_2, O_2, He, etc.

Gas mask contains

A. Charcoal granules

B. powdered charcoal

C. calcuim charbonate

D. Fuller's earth

Answer: B

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3. Only the surface atoms in an adsorbent, play an active role in adsorption. These atoms posses some residual forces like vander Waal's forces and chemical forces. In the process of adsorption, weak adsorbate is substituted by strong adsorbate. Activated charcoal used in gas mask is already exposed to the atmospheric air, so the gases and water vapours in air are adsorbed on its surface. When the mask is exposed to chlorine atmosphere, the gases are displaced by chlorine. Porous and finely powdered solids, e.g., charcoal and Fuller's earth adsorb more as compared to the hard non-porous material. It is due to this property that the powdered characoal is used in gas masks. In general, easily liquefiable gases like CO_2, NH_3, Cl_2, and SO_2 etc., are adsorbed to a greater extent than the elemental gases, eg., H_2, N_2, O_2, He, etc.

Which of the following gases will substitute O_2 from adsorbed charcoal

A. H_2

B. N_2

C. Ar

D. Cl_2

Answer: D

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4. Emulsions are normally prepared by shaking the two components together vigorously although some kind of emulsifying agent usually has to added to stabilize the product. This emulsifying agent may be a soap or other surfactant (surface active) species or a lyophilic sol. Emulsions are broadly classified into two types :

(i) Oil in water emulsions (O/W): Oil acts as dispersed phase and water acts as dispersion medium

(ii) Water in oil emulsions (W/O) : Water acts as dispersed phase and oil acts as dispersion medium.

Dye test, dilution test may be employed for identification of emulsions.

Read the two statements :

A) Milk is an example of oil in water (O/W) type emulsion

B) Cold cream is an example of water in oil (W/O) type emulsion

A. Only statement (A) is correct

B. Only statement (B) is correct

C. Both are correct

D. None of these

Answer: C

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5. Emulsions are normally prepared by shaking the two components together vigorously although some kind of emulsifying agent usually has to added to stabilize the product. This emulsifying agent may be a soap or other surfactant (surface active) species or a lyophilic sol. Emulsions are broadly classified into two types :

(i) Oil in water emulsions (O/W): Oil acts as dispersed phase and water acts as dispersion medium

(ii) Water in oil emulsions (W/O) : Water acts as dispersed phase and oil acts as dispersion medium.

Dye test, dilution test may be employed for identification of emulsions.

Select correct statement :

A. Water in oil emulsions are less viscous than the aqueous emulsions

B. Electrical conductance of ageous emulsions is less that that of oil emulsions

C. Deemulsification can be done by soap or detergent

D. An emulsion can be diluted with H_2O then it is oil in water (O/W) type emulsion

Answer: D

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6. Stability of emulsions increases by adding

A. electrolyte

B. Acid

C. Base

D. Emulsifying agent

Answer: D

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PRACTICE SHEET - 1 (MATCH THE FOLLOWING QUESTIONS)

1. Match the entries of Column-I with appropriate entries of Column-II

COLUMN - I	COLUMN - II
A) Physisorption	p) Always unimolecular
B) Activated adsorption	q) Multi molecular
C) Chemisorption	r) High temperature is required
D) Desorption	s) Low pressure is required

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2. Match the entries of Column-I with appropriate entries of Column-II

COLUMN - I	COLUMN - II
A) peptization	p) preparation of sols
B) ultra centrifugation	q) purification of sols
C) elctrodialysis	r) preparation of metal sols
D) Bredig's arc method	s) Movements of ions across the membrane in presence of electric field

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PRACTICE SHEET - 1 (INTEGER ANSWER TYPE QUESTIONS)

1. The coagulation of 100 ml gold sol is completely prevented by adding 0.25 g of starch to it before adding 10 ml of 10% NaCl solution. Calculate the gold number of starch.

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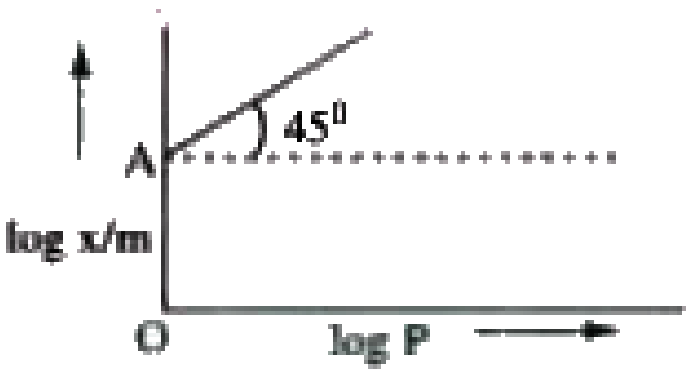
2. If $\theta = 45^\circ$ in the figure given below. Calculate the value of 'n' in Freundlich adsorption isotherm.



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3. 50 ml of 1 M acetic acid is skaken with 0.5 g wood charcoal. The final conc. of the solution after adsorption is 0.5 M. What is the amount of acetic acid adsorbed per gram of carbon?

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4. 0.05 moles of $AICI_3$ is required to coagulate 500 ml of As_2S_3 sol. If its coagulation value is 10^x find x

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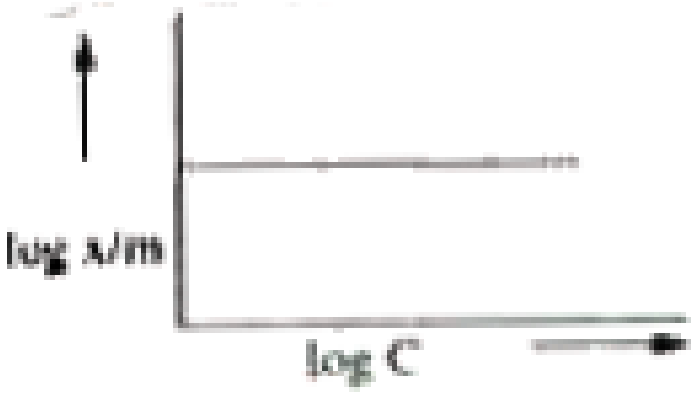
5. For the adsorption of solution on a solid surface $\frac{x}{m} = kc^{1/n}$. Adsorption isotherm of $\log\left(\frac{x}{m}\right)$ vs log C was found of the type (Fig). This is when C = ...



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6. In an experiment, 500ml of 0.5M hydrated oxalic acid is shaken with 5g of activated charocal and filtered. The conc. of filtrate is 0.4 M. If the extent of adsorption $\left(\frac{x}{m}\right)$ is 1.26×10^{-x} then x = __?

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PRACTICE SHEET - 2 (SINGE OR MORE THAN ONE OPTION QUESTIONS)

1. Which one of the following has maximum value of floccualtion power

A. Pb^{2+}

B. Pb^{4+}

C. Sr^{2+}

D. Na^{+}

Answer: B

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2. During electro osmosis of $Fe(OH)_3$ sol

A. sol particles move towards anode

B. sol particles move towards cathode

C. the dispersion medium moves towards anode

D. the dispersion medium moves towards cathode

Answer: C

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3. Which of the following electrolytes will be most effective ion in the coagulation of gold sol

A. $NaNO_3$

B. $K_4\left[Fe(CN)_6\right]$

C. Na_3PO_4

D. $MgCl_2$

Answer: D

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4. The coagulating power of an electrolyte for Aresenious sulphide sol decreases in the order

A. $Na^+ > Al^{3+} > Ba^{2+}$

B. $PO_4^{3-} > SO_4^{2-} > Cl^-$

C. $Cl^- > SO_4^{2-} > PO_4^{3-}$

D. $Al^{3+} > Ba^{2+} > Na^+$

Answer: D

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5. For the coagulation of 100ml of a positive sol 10ml of 1M sodium chloride is required. Calculate the flocculation value.

A. 0.365

B. 36.5

C. 100

D. 200

Answer: C

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6. Blue colour of the sky is due to

A. Absorption of light by dust particle

B. Scattering of light by dust particle

C. Reflection of light by dust particle

D. Presence of clouds

Answer: B

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7. The volume of a colloidal particle V_c as compared to the volume of a solute particle in a true solution V_s could be

A. $\frac{V_c}{V_s} = 10^3$

B. $\frac{V_c}{V_s} = 10^{-3}$

C. $\frac{V_c}{V_s} = 10^{23}$

D. $\frac{V_c}{V_s} = 1$

Answer: A

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8. The apparatus used to coagulate carbon particles from smoke is called

A. Cottrell smoker

B. Cottrell absorber

C. Cottrell precipitator

D. None

Answer: C

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9. Soap removes grease by

A. Adsorption

B. Emulsification

C. Coagulation

D. None of these

Answer: B

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10. Select the incorrect statement

A. Gold sol is multimolecular colloid

B. Large number of atoms of a substance aggregate together and form multi molecular colloids

C. Metal suphides are lyophobic colloids

D. suphur sol is multimolecular colloids and hydrophilic nature

Answer: D

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11. Electrical charge on a colloidal particle is indicated by

A. Brownian movement

B. electrophoresis

C. ultra microscope

D. Flocculation

Answer: B::D

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12. Coagulation or de-emulsification can be done by which of the methods given below.

A. by addition of a substance which would destory the emulsifer

B. by addition of an electrolyte which would destory the charge

C. by heating, freezing and centrifuging

D. by electro phoresis

Answer: B::C::D

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13. Bleeding of blood is stopped due to

A. the coagulation of blood by appplying $FeCl_3$ and blood vessel is sealed

B. the coagulation of blood by applying Alum and blood vessel is sealed

C. blood combines with the $FeCl_3$

D. blood combines with Alum

Answer: A::B

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14. Zeta potential or Electro kinetic potential is dependent on

A. Viscosity

B. dielectric constant

C. Velocity of the colloidal particles when an electrical field is applied

D. Nernst potential

Answer: A::B::C

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15. Which of the following can form anionic micelle

A. $C_{12}H_{25}COONa$

B. $C_{12}H_{25}SO_4Na$

C. $C_{12}H_{25}SO_4Na$

D. $C_{12}H_{25}(NH_3)_3Cl$

Answer: A::B::C

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16. Consider the following statements for micelles, which are correct

A. At CMC, several properties of solution of surfactant such as molar conductivity, surface tension and osmotic pressure change

B. Micelles from ionic surfactants can be formed only above a certain temperature called the kraft temperature

C. Micelle formation is exothermic

D. Micelles are associated colloids

Answer: A::B::C::D

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PRACTICE SHEET - 2 (LINKED COMPREHENSION TYPE QUESTIONS)

1. What is coagulation ?

A. K^+

B. Ca^{2+}

C. Al^{3+}

D. Sn^{4+}

Answer: D

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2. Coagultion is the process by which the dispersed phase of a colloid is made to aggregate and thereby separate from the continuous phase. The minimum concentration of an electrolyte in milli-moles per litre of the electrolyte solution which is required to cause the coagulation of colloidal sol is called coagulation value. Therefore higher is the coagulating power of effective ion, smaller will be the coagulation value.

Coagulation value of the electrolyte $\alpha \frac{1}{\text{coagulating power}}$

The coagualtion value of different electrolytes are different. This behaviour can be easily understood by hardy-schulze rule which states. "The greater is the valency of the effective ion greater is its precipitating power."

As_2S_3 sol is negatively charged, capacity to precipitate it is highest in which ion ?

A. K_2SO_4

B. Na_3PO_4

C. $AlCl_3$

D. $CaCl_2$

Answer: C

Watch Video Solution

3. Coagultion is the process by which the dispersed phase of a colloid is made to aggregate and thereby separate from the continuous phase. The minimum concentration of an electrolyte in milli-moles per litre of the electrolyte solution which is required to cause the coagulation of colloidal sol is called coagulation value. Therefore higher is the coagulating power of effective ion, smaller will be the coagulation value.

Coagulation value of the electrolyte $\alpha \frac{1}{\text{coagulating power}}$

The coagualtion value of different electrolytes are different. This behaviour can be easily understood by hardy-schulze rule which states. "The greater is the valency of the effective ion greater is its precipitating power."

The coagulation of colloidal particles of the sol can be caused by :

A. Heating

B. Adding electrolyte

C. Adding oppsitely charged sol

D. All of these

Answer: D

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4. Detergents are sodium of potassium salts of sulphonic acids. Phosphates are added to commercial detergents because they form complex with metal ion that contributes water hardness and keep them dissolved. They also control acidity and micelle formation. Phosphates arediscouraged because there is overgrowth of vegetation and decay of dead plants reduceamount of dissolved oxygen.

Which of the following are cationic detergents ?

A. $\left[CH_3(CH_2)_{15}N(CH_3)_3\right]Cl$

B. $CH_3(CH_2)_{16}COO(CH_2CH_2O)_{11}CH_2CH_2OH$

C. $CH_3(CH_2)_{16}OSO_3Na$

D. $C_{17}H_{35}COONa$

Answer: A

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5. Detergents are sodium of potassium salts of sulphonic acids. Phosphates are added to commercial detergents because they form complex with metal ion that contributes water hardness and keep them dissolved. They also control acidity and micelle formation. Phosphates arediscouraged because there is overgrowth of vegetation and decay of dead plants reduceamount of dissolved oxygen.

1 mole of $[AgI]Ag^+$ sol is coagulated by

A. Detergents having linear alkyl chain

B. Detergents having maximum branching

C. Both (a) and (b)

D. Neither (a) nor (b)

Answer: A

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6. Detergents are sodium of potassium salts of sulphonic acids. Phosphates are added to commercial detergents because they form complex with metal ion that contributes water hardness and keep them dissolved. They also control acidity and micelle formation. Phosphates arediscouraged because there is overgrowth of vegetation and decay of dead plants reduceamount of dissolved oxygen.

1 mole of $[AgI]Ag^{+}$ sol is coagulated by

A. 1 mole of KI

B. $500 ml of 1 M K_2SO_4$

C. 1 lit of 1 M KI

D. None

Answer: A::B::C

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PRACTICE SHEET - 2 (MATCH THE FOLLOWING QUESTIONS)

1. Match the entries of Column-I with appropriate entries of Column-II

COLUMN - I	COLUMN - II
A) Conversion of proteins into amino acids	p) Shape selective catalysts
B) Conversion of Alcohols into gasoline	q) Enzymatic catalysis
C) Polymerisation of ethylene	r) Zeigler-Natta catalyst
D) Manufacture of margarine	s) Heterogeneous catalysis

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2. Match the entries of Column-I with appropriate entries of Column-II

COLUMN - I	COLUMN - II
A) As_2S_3 sol	p) Lyophobic colloid
B) Sulphur sol	q) Macromolecular colloid
C) Starch	r) Multimolecular colloid
D) Soap	s) Associated colloid

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PRACTICE SHEET - 2 (INTEGER ANSWER TYPE QUESTIONS)

1. At STP the volume of nitrogen gas required to cover a sample of silica gel, assuming Langmuir monolayer adsorption, is found to be $1.33cm^3g^{-1}$ of the gel. The area occupied by a nitrogen molecule is $0.14nm^2$? What is the surface area per gram of silica gel (in m^2) ?

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2. The particle size of suspension should be greater than $10 \times A^\circ$, x is.....

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3. The no of moles of lead nitrate needed to coagulate 2 moles of colloidal $[AgI]I^-$ is

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4. A detergent $\left[C_{12}H_2SO_4^- Na^+\right]$ solution becomes a colloidal sol at a conc. of $10^{-3}M$ on an average 10^{13} colloidal particles are present in lmm what is the average no.of ions are contain in one colloidal particle (micelle) no.of ions $6x10^x$. x is .....

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5. In an experiment addition of 10ml of $0.05MBaCl_2$ to 20ml of As_2S_3 sol causes coagulation in 1 hr. If the coagulation value of Ba^{+2} ion is x^2 then x = ___?

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6. When $1.0 \times 10^{-5} mg$ of a protective colloid is added to 20 ml of standard gold sol, the precipitation of gold sol was prevented by adding 5 ml of 10% solution of NaCl. If the gold number of protective colloid is $2.0x10^{-x}$ mg then x is = __?

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PRACTICE SHEET - 3 (SINGE OR MORE THAN ONE OPTION QUESTIONS)

1. A sample of 16gr of charcoal was brought into contact with CH_4 gas contained in a vessel of llitre at $27^\circ C$ the pressure of gas was found to fall from 760 to 608 torr. The density of charcoal sample is $1.6gr/cm^3$. What is the volume of the CH_4 gas adsorbed per gram of the adsorbent at 608 torr and $27^\circ C$

A. 125ml/gr

B. 26ml/gr

C. 16.25ml/gr

D. None

Answer: C

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2. 10% sites of catalyst bed have adsorbed by H_2 on heating H_2 gas is evolved from sites and collected at 0.03atm and 300K in a small vessel of $2.46cm^3$. No.of sites available is 5.4×10^{16} per cm^2 and surface area is $1000cm^2$. Findout the no.of surface sites occupied per molecule of $H_2\left(N_A = 6x10^{23}\right)$

A. 1

B. 2

C. 3

D. 4

Answer: C

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3. When a solution of acetic acid in water is shaken with charcoal

A. the concentration of acid increases in solution due to adsorption of water by charcoal

B. the concentration of acid decreases in solution due to the reaction of charcoal with acid

C. the concentration of acid remains constant as both water and acid are adsorbed by charcoal

D. the concentration of acid decreases in solution due to adsorption of some part of acid by charcoal

Answer: D

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4. Which is correct statement regarding enzyme catalysis

A. catalytic activity of amylase is enhanced considerably in presence of Co^{+2} ions which act as activators

B. trypsin converts proteins into preptides in stomach

C. a small non-protein present along with an enzyme enhance catalytic activity considerably

D. active centres on the surface of enzyme prarticles are $-NO_2,\ -OCH_3,\ -C_2H_5$ etc

Answer: C

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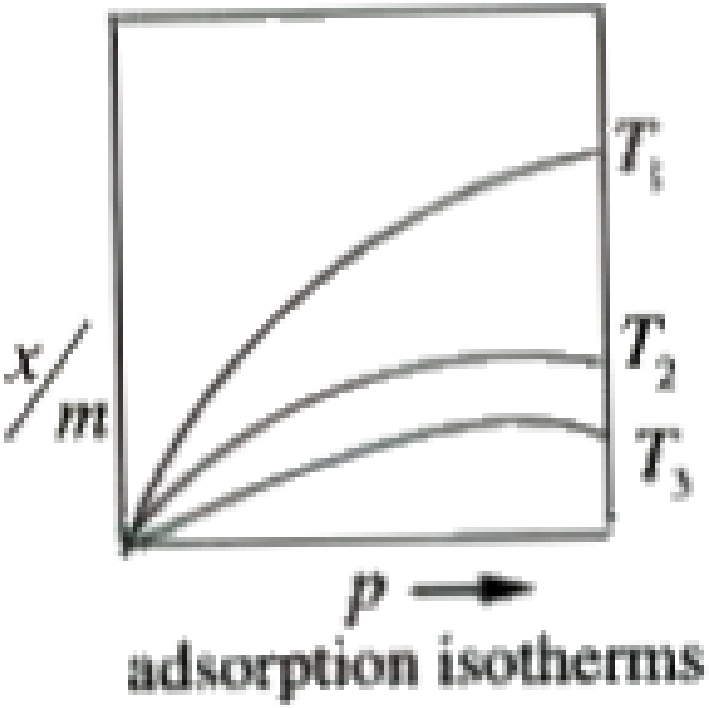
5. Which of the following are correct



A) $T_3 > T_2 > T_1$

B) At fixed pressure there is decrease in physical adsorption with decreases in temperature.

C) At high pressure there is saturation of adsorption

A. A, B &C

B. A & B Only

C. B & C only

D. A & C Only

Answer: D

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6. In freundlich adsorption isotherm, the value of 1/n is

A. any value from 0 to 1

B. Less than 1

C. Greater than 1

D. a positive or negative fractional number

Answer: C

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7. Plot of $\log\frac{x}{m}$ against log p is a straight line inclined at an angle of 45°. When the pressure is 0.5atm and k value is 10, the amount of solute adsorbed per gram of adsorbent will be

A. 5gm

B. 10gm

C. 1gm

D. 15gm

Answer: A

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8. The volumes of gases H_2, CH_4, CO_2 and NH_3 adsorbed by 1gr of charcoal at 288K are in the order

A. $H_2 > CO_2 > NH_3$

B. $NH_3 > H_2 > CO_2$

C. $CO_2 > NH_3 > H_2$

D. $NH_3 > CO_2 > H_2$

Answer: D

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9. Which of the following is lyophobic colloidol solution?

A. Jellies

B. Gelatin

C. Curd

D. Milk

Answer: A

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10. The catalyst used in the manufacture of H_2 by Bosche's process is

A. Cr_2O_3

B. $Fe_2O_3 + Cr_2O_3$

C. Fe_2O_3

D. Cu

Answer: B

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11. Assosiated colloids

A. Which consist of aggregate of atoms and molecules with diameter less than 1 mm

B. Substances which behave like colloids only at higher concentration in solution

C. Substances which behave like colloids only at lower temperature

D. All the above

Answer: A::B

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12. The emulsifier added to equal quantity of oil and water has the affinity towards oil. Then which of the following are correct

A. That emulsion acts as conductor if NaCl is added

B. It can give colour droplets with water soluble dye

C. It can be diluted with water

D. The viscosity of the solution is nearly equal to oil

Answer: A::C

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13. What are correct statements ?

A. Metals sols possess '-ve' charge on scattered particle

B. $FeCl_3$ on dissolving in hot water gives a +ve sol

C. Mixing two opposite sols causes coagulation

D. Prolonged electrolysis stabilises a sol

Answer: A::B::C

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14. Which statements are correct ?

A. Heterogeneous catalysis takes place through adsorption

B. Homogeneous catalysis occurs through intermediate formations

C. A catalyst can revert the sign of ΔG

D. A catalyst increases the energy of activation of a reaction

Answer: A::B

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15. Which statements are correct ?

A. During formation of micelle from soap solution above craft temperature only systems Gibb's energy decreases

B. Formation of micelle is associated with $\Delta S > O, \Delta H < O$

C. Due to micelle formation the colligative properties of solution decrease

D. Cleaning action of soap involves emulsification

Answer: A::C::D

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16. Which statements are correct?

A. A gas with greater critical temperature gets more adsorbed

B. The type of adsorption can be determined from the adsorption isobars

C. Chemisorption if reversible in nature

D. Variation of extent of adsorption with temperature tells about the type of adsorption

Answer: A::B::D

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PRACTICE SHEET - 3 (LINKED COMPREHENSION TYPE QUESTIONS)

1. A catalyst alters the rate of a reaction by leading of increasing the energy of activation, In Heterogeneus catalysis adrosption mechanism occurs and Hemogeneus. Catalysis intermediate formation occurs. In auto catalysis one of the products acts on catalyst.

The ΔH of a reaction $A + B \rightarrow C$ is d$-20KJmol^{-1}$. When a catalyst is used. What is ΔH for the reaction without catalyst (magnitude)

A. $< 20KJ$

B. $> 20KJ$

C. $20KJ$

D. Depends on catalyst

Answer: C

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2. A catalyst alters the rate of a reaction by leading of increasing the energy of activation, In Heterogeneus catalysis adrosption mechanism occurs and Hemogeneus. Catalysis intermediate formation occurs. In auto catalysis one of the products acts on catalyst.

$2SO_2 + O_2 \xrightarrow{NO(g)} 2SO_3$. This reaction is carried out through formation of ----- intermediate.

A. N_2O

B. NO_2

C. N_2O_4

D. N_2O_3

Answer: B

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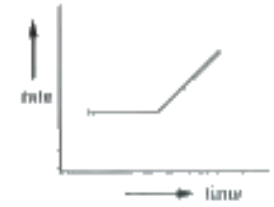
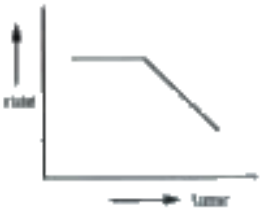
3. A catalyst alters the rate of a reaction by leading of increasing the energy of activation, In Heterogeneus catalysis adrosption mechanism occurs and Hemogeneus. Catalysis intermediate formation occurs. In auto catalysis one of the products acts on catalyst.

$AsH_3 \rightarrow As + 3H_2$. The reaction is auto catalysed. Which graph is correct for it?

A.



B.



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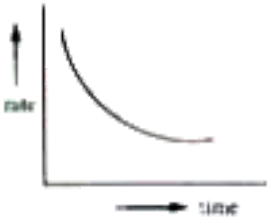
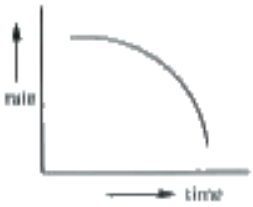


D.



Answer: A

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4. Micelles are formed from concentrated soap solutions above critical micelle concentration. Micelles are regarded as associate colloids as soap ions associate to give micelles.

Concentration of uniform 'micelle' particles at CMC of a surfactant solution is 0.004M. Charge carried by each micelle is 4×10^{-17} coloumbs. What is the molar concentration of the surfactant (soap) at CMC ?

A. $1M$

B. $0.5M$

C. $0.2M$

D. $0.3M$

Answer: A

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5. Micelles are formed from concentrated soap solutions above critical micelle concentration. Micelles are regarded as associate colloids as soap ions associate to give micelles.

Which of the following give a positive micelle ?

A. $CH_3 - CH(CH_3)_2 - (CH_2)_5 - N(CH_3)_2 / HCl$

B. $C_{17}H_{35}COOH / KOH$

C. $C_{12}H_{25}SO_3H / KOH$

D. $C_{17}H_{35}COONa$

Answer: A

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6. Micelles are formed from concentrated soap solutions above critical micelle concentration. Micelles are regarded as associate colloids as soap ions associate to give micelles.

During micelle formation ..... in solution

A. VantHoff factor increases

B. Colligative propertis increases

C. VantHoff factor decreases

D. Entropy decreases

Answer: B

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PRACTICE SHEET - 3 (MATCH THE FOLLOWING QUESTIONS)

1. Match the following questions

COLUMN - I	COLUMN - II
A) Gold sol	p) Bredig's Arc method
B) Purification of Colloidal solution	q) - ve charged
C) As_2S_3 sol	r) Ultra centrifugation
D) Zeta potential	s) Electro kinetic potential
	t) Double decomposition reaction

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2. Matching

List - I	List - II
A) Adding excess KI to $AgNO_3(aq)$	p) +ve mobile layer
B) Adding excess $AgNO_3$ to aq.KI	q) -ve mobile layer
C) Adding excess NaCl to Gold Sol	r) Flocculation
D) Removing excess electrolyte from a sol	s) Stabilisation of sol

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PRACTICE SHEET - 3 (INTEGER ANSWER TYPE QUESTIONS)

1. One gram of activated carbon has a surface area of $1000m^2$ considering complete coverage as well as monomolecular adsorption. How much ammonia at latm and 273K would be adsorbed on the surface of 44/7gr. carbon. If radius of a ammonia molecule is $10^{-8}cm$ .....

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2. Exactly 8mg of a lyophilic 'sol' is added to 20ml of a gold sol to protect against addition of 2ml of 20% NaCl. What is the gold number of the

given sol?

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3. 20ml of 0.1M of an electrolyte could cause flocculation of 980ml of a sol. What is the flocculation value of the electrolyte?

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4. One litre of $1MCH_3COOH$ solution is thoroughly agitated with 6gms of charcoal. After the processthe solution shows 0.9M concentration. What is $'\frac{x}{m}'$ of adsorption.

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5. Change of catalyst changed products

$$CO + 3H_2 \xrightarrow{Ni} X + H_2O$$

$$CO + 2H_2 \xrightarrow[Cr_2O_3]{Cu\,/\,ZnO} Y$$

$CO + H_2 \xrightarrow{Cu} Z.$

The magnitude of the algebraic sum of the oxidation state of carbon in X, Y and Z is _____

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6. During oxidation of oxalic acid by acidified $KMnO_4$ how many unpaired electrons are present in the autocatalyst ?

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PROBLEM

1. Why does physisorption decrease with the increase of temperature ?

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2. Critical temperature of SO_2, N_2, NH_3 and CH_4 are 430 K, 126K, 406 K and 356 K. Arrange in the descending order of volume of these gases adsorbed per gram of charcoal.

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3. Per two gram of charcoal, a gas is adsorbed by 0.1g and 0.2g at 10 torr and 80 torr pressure respectively. Calculate the n value in Freundlich adsorption isotherm.

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4. In Langmuir adsorption isotherm, what is the slope and Y-intercept?

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5. The curve showing variation of x/m with temperature is inverted 'V' shape. What is the type of adsorption ?

Watch Video Solution

6. What role does adsorption play in heterogenous catalysis.

Watch Video Solution

7. Why is ester hydrolysis slow iin the beginning but is fast after sometime ?

Watch Video Solution

8. Why is it necessary to remove CO when ammonia is obtained by Haber's process?

Watch Video Solution

9. How to save a patient suffering from kidney failure?

Watch Video Solution

10. Is it possible to know the size and shape of colloidal particles by using ultramicroscope ?

Watch Video Solution

11. For coagulation of 10ml of a positive sol, the volumes of IM each $NaCl, Na_2, SO_4, Na_3PO_4$ and $Na_4\left[Fe(CN)_6\right]$ required separately are P, Q, R and S ml respectively. Arrange P, Q, R and S in the descending order.

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12. One gram of charcoal adsorbs 100ml of 0.5M CH_3COOH to form a monolayer and there by the molarity of acidic acid is reduced to 0.49M. Calculate the surface area of the charcoal adsorbed by each molecule of acetic acid (surface area of charcoal is $3.01 \times 10^2 m^{2/g}$).

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13. Gold numbers of four protective colloids A, B, C and D are 0.5 , 0.01, 0.1 and 0.005 respectively. Arrange them in the correct order of their protective power.

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14. For the coagulation of 100ml of arsenious sulphide solution, 5ml of IM NaCl is required. Calculate the flocculation value.

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15. Ferric chloride forms both positively and negatively charged sols. Explain.

Watch Video Solution

16. Tyndall effect is observed during the projection in a cinema theatre. Why?

Watch Video Solution

17. Comment on artificial rain.

Watch Video Solution

18. The coagulation of 100ml gold sol is completely prevented by adding 0.25g of starch to it before adding 10ml of 10% NaCl solution. Calculate the gold number of starch.

Watch Video Solution

19. Write the difference in the size of sterate anion and stearate micelle.

Watch Video Solution

20. How are associated colloids different from multimolecular and macromolecular colloids?

Watch Video Solution

21. Why gelatin is added to ice cream?

Watch Video Solution

22. How are emulsions useful in digestion ?

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SUBJECTIVE EXERCISE -1 (SHORT ANSWER QUESTION)

1. Explain the terms "adsorption" and "absorption" with at least two examples.

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2. Distinguish between adsorption and absorption. Give one example of each.

Watch Video Solution

3. Give the differences between physical adsorption and chemical adsorption.

Watch Video Solution

4. Give an account of Freundlich adsorption isotherm.

Watch Video Solution

5. Explain adsorption of solute from solutions with examples.

Watch Video Solution

6. Given an account of adsorption of gases by metals with examples.

Watch Video Solution

SUBJECTIVE EXERCISE -1 (VERY SHORT ANSWER QUESTION)

1. Give the effect of temperature on adsorption of gases by metals.

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2. What is absorption? Explain with two examples?

Watch Video Solution

3. What is physical adsorption ? Give an example.

Watch Video Solution

4. What is chemical adsorption ? Give an example.

Watch Video Solution

5. What is adsorption ? Explain different types of adsorptions with suitable examples.

Watch Video Solution

6. What is an adsorption isotherm ? Write the equation of Freundlich adsorption isotherm.

Watch Video Solution

7. Give the differences between physical adsorption and chemical adsorption.

Watch Video Solution

8. What is the type of adsorption involved in the Dewar method of separation of inert gases ?

Watch Video Solution

9. The curve showing variation of x/m with temperature is inverted 'V' shape. What is the type of adsorption ?

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SUBJECTIVE EXERCISE -2 (SHORT ANSWER QUESTION)

1. What is catalysis ? How is catalysis classified ? Give two examples for each type of catalysis.

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2. What are the characteristics of a catalyst?

Watch Video Solution

3. Explain homogeneous and heterogeneous catalysis. Give two examples for each. Give their mechanisms.

Watch Video Solution

4. Explain the adsorption theory of catalysis with one example.

Watch Video Solution

5. Explain with examples the following:

(i) Promotor and ii) Autocatalyst

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6. How is catalysis classified ? Give two examples.

Watch Video Solution

7. What are enzymes ? Write in brief the mechaism of enzyme catalysis.

Watch Video Solution

SUBJECTIVE EXERCISE -2 (VERY SHORT ANSWER QUESTION)

1. What is homogeneous catalysis ? How is it different from heterogeneous catalysis ?

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2. What is hetergeneous catalysis.

Watch Video Solution

3. What are the catalysts used in the reaction.

i) $N_{2(g)} + 3H_{2(g)} \rightarrow 2NH_{3(g)}$

ii) $2SO_{2(g)} + O_{2(g)} \rightarrow 2SO_{3(g)}$

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4. What is negative catalyst ? Give example.

Watch Video Solution

5. What do you mean by activity and selectivity of catalyst ?

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SUBJECTIVE EXERCISE -3 (SHORT ANSWER QUESTION)

1. What are colloids. Give the differences between 'colloidal solutions' and 'true solutions'.

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2. Explain the terms dispersed phase and dispersion medium with reference to smoke, cloud, blood, gold sol, starch sol and milk.

Watch Video Solution

3. What are protective colloids? Define and explain gold number.

Watch Video Solution

4. Distinguish between lyophilic and lyophobic sols.

Watch Video Solution

5. How are colloids classified ? Give examples.

Watch Video Solution

6. Explain coagulation with suitable examples.

Watch Video Solution

7. Explain the terms : electrophoresis, zeolite and dialysis.

Watch Video Solution

8. Write in brief about applications of co!loids.

Watch Video Solution

SUBJECTIVE EXERCISE -3 (VERY SHORT ANSWER QUESTION)

1. Explain Tyndall effect and Brownian movement.

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2. What is coagulation ? Explain with suitable examples.

Watch Video Solution

3. What is a gold sol and gold number?

Watch Video Solution

4. What is protective colloid ?

Watch Video Solution

Watch Video Solution

5. How are colloids classified ? Give examples.

Watch Video Solution

6. Starch solution is not coagulated by the addition of salt solution but gold sol is coagulated. Why?

Watch Video Solution

7. What is electrodialysis ?

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SUBJECTIVE EXERCISE -4 (VERY SHORT ANSWER QUESTION)

1. How is cream converted into butter?

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SUBJECTIVE EXERCISE -4 (SHORT ANSWER QUESTION)

1. Give four uses of emulsions.

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2. Discuss the mechanism of micelle formation

Watch Video Solution

3. What are emulsion ? How are they classified ? Describe the applications of emulsions.

Watch Video Solution

4. Explain the phenomenon of cleaning of clothes by using detergents and soaps.

Watch Video Solution

SUBJECTIVE EXERCISE -4 (VERY SHORT ANSWER QUESTION)

1. What is a micelle? Give an example of micelle formation.

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2. Write any two important applications of the emulsions.

Watch Video Solution

3. What are head and tail in stearate ion ?

Watch Video Solution

4. What is critical micelle concentration (CMC) and kraft temperature (T_k) ?

Watch Video Solution

5. Give one example each of soap and detergent.

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Objective Excersice - 1

1. Adsorption is the phenomenon in which a substance

A. Accumulates on the surface of other substance

B. Goes into the body of the other substance

C. Remains close to the other substance

D. Does not accumulates on the surface of the other substance.

Answer: A

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2. The following are some statements about physical adsorption

A) involves the weak Vanderwaals interaction between the adsorbate and adsorbent.

B) Involves the chemical interactions between the adsorbent and adsorbate

C) is irreversible in nature

D) It depends upon both nature of adsorbent and adsorbate

The correct combination is

A. All are correct

B. Only (A) and (B)

C. Only (A) and (C)

D. Only (A)

Answer: D

Watch Video Solution

3. Adsorption phenomenon involves

(A) residual attraction forces

(B) a spontaneous phenomenon

(C) a gaseous adsorbent

A. A and C are correct

B. B and C are correct

C. A and B are correct

D. A, B and C are all correct

Answer: C

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4. In adsorption of oxalic acid on activated charcoal, the activated charcoal is called

A. Adsorbent

B. Adsorbate

C. Adsorber

D. Adsorber

Answer: A

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5. Valence forces cause

A. Chemisorption

B. Ionic bond

C. Sorption

D. Adsorption involving multi layers

Answer: A

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6. The bond between the adsorbate and adsorbent in chemisorption is

A. Ionic bond

B. Covalent bond

C. Either ionic or covalent bond

D. Vanderwall forces

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7. The nature of forces operating between the adsorbate and the adsorbent in the adsorption occuring at high temperature is

A. van der waals forces

B. Chemical forces

C. Gravitational forces

D. Fermi forces

Answer: B

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8. Which of the following statements is true in the case of physical adsorption of gases on solids

A. It is exothermic process

B. It depends on the ease of liquification of the gas

C. It decreases with increase in temperature

D. All the above

Answer: D

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9. Which of the following is chemisorption

A. Adsorption of H_2 on Ni t high temperature

B. Adsorption of H_2 on charcoal

C. Adsorption of moisture on silica gel

D. Dehydration by using anhydrous $CaCl_2$

Answer: A

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10. Adsorption is multilayered in case of

A. Chemisorption

B. Desorption

C. Physical adsorption

D. Both chemissorption and desorption

Answer: C

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11. Which of the following is not a characteristic of chemisorption

A. It is irreversible

B. It is specific

C. It is multi layer phenomenon

D. Heat of adsoption is about 40-400 KJ

Answer: C

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12. The temperature above which a gas cannot be liquified even on application of high pressure is called

A. Boiling point

B. Freezing point

C. Critical temperature

D. Boyle's temperature

Answer: C

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13. The higher the critical temperature of the gas

A. Greater is its extent of adsorption

B. Lower its adsorption

C. Lesser is the case if liquification

D. Lesser is its volatile nature

Answer: A

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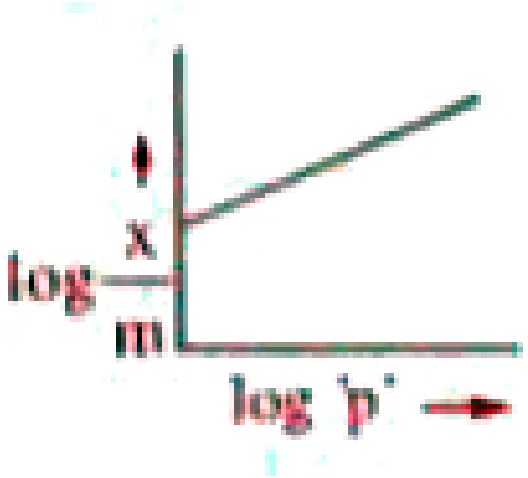
14. Freundlich adsorption isotherm is given by the expression $\frac{x}{m} = kp^{\frac{1}{n}}$.

Then the slope of the line in the following plot is



A. $\sqrt{n}$

B. 1/n

C. x/m

D. p

Answer: B

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15. The plot of x/m versus temperature at constant pressure is called

A. Adsorption isotherm

B. Adsorption isobar

C. Adsorption isochore

D. Freundlich isotherm

Answer: B

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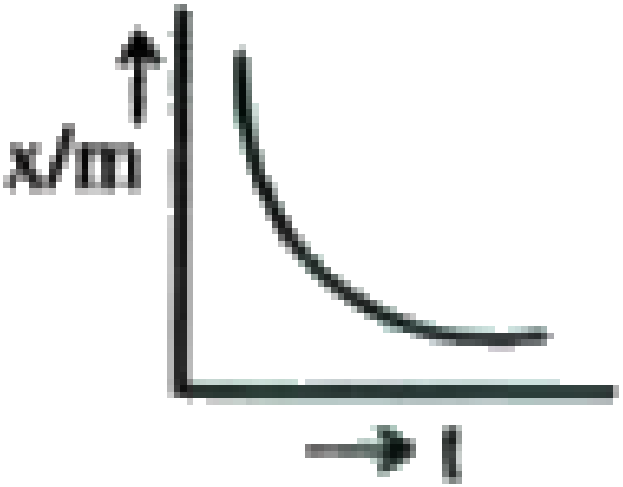
16. The type of adsorption depicted by the adsorption isobar



A. Physical

B. Chemical

C. Both (1) and (2)

D. None of these

Answer: A

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17. Which statement is correct about physical adsorption?

A. It is highly specific

B. It is unimolercular layer adsorption

C. It depends on critical temperature of adsorbate

D. It is irreversible

Answer: C

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18. When $0.1MCH_3COOH$ solution is shaken with activated charcoal and the charcoal is filtered out, the concentration of acid -

A. Increases

B. Decreases

C. Remains unchanged

D. Unpredicted

Answer: B

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19. Which of the following is adsorbed to a maximum extent on a given amount of adsorbent?

A. H_2

B. N_2

C. O_2

D. SO_2

Answer: D

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20. The phenomenon of simultaneous absorption and adsorption is called

A. Sorption

B. Desorption

C. Chemisorption

D. Absorption

Answer: A

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21. $\frac{x}{m} = KC^{1/n}$ where $C =$ Concentration of a m solution, x = wt of adsorbed solute m =Wt of adsorbent. The equation represents -

A. Langmuir adsorption isotherm

B. Freundlich adsorption isotherm

C. Arhenius equation

D. Chemi sorption isotherm

Answer: B

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22. A graph drawn between $'\log. \frac{x}{n}'$ and log p on 'X' and 'Y' axis respectively could be - regarding physical adsorption

A. Hyperbola

B. Parabola

C. Straight line with positive slope

D. Straight line with negative slope

Answer: C

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23. Which of the following is not correct?

A. Enthalpy of physical adsorption is less when compared to enthalpy of chemical adsorption

B. Milk is an example of emulsion

C. Physical adsorption increases with increases in temperature

D. Smoke is an aerosol

Answer: C

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24. Which of the following can not act as an adsorbent?

A. Silica gel

B. Clay

C. Oxygen gas

D. Activated charcoal

Answer: C

Watch Video Solution

25. Which can adsorb maximum amount of H_2?

A. A platinum black

B. Powdered paladium

C. A platinum rod

D. Nickel sphere

Answer: B

Watch Video Solution

26. What is the name given to the phenomenon when bopth absorption and adsorption take place together ?

A. Chemisorption

B. Physisorption

C. Desorption

D. Sorption

Answer: D

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27. Which one of the following is an example of adsorption?

A. Ammonia in contact with water

B. Anhydrous $CaCl_2$ with water

C. Silica gel in contact with water vapours

D. All of these

Answer: C

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28. Adsorption of gases on solid surface is generally exothermic because

(IIT Screening)

A. Enthalpy is positive

B. Entropy decreases

C. Entropy increases

D. Free energy inceases

Answer: B

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29. the adsorption of solids, from a solution is called

A. Chemical adsorption

B. Physical adsorption

C. Positive adsorption

D. Negative adsorption

Answer: B

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30. A graph of adsorption isobar of chemisorption shows that adsorption

A. First decreases with temperature and then increases

B. First increases with temperature and then decreases

C. Increases with temperature

D. Decreases with temperature

Answer: B

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31. Which of the following is the correct Freundlich's formula? (w=weight of adsorbate, m=mass of adsorbent)

A. $\frac{w}{m} = kP^{\frac{1}{n}}$

B. $\frac{w}{m} = kP^{2n}$

C. $\frac{w}{m} = kP^{n}$

D. $\frac{m}{w} = kP^{\frac{1}{n}}$

Answer: A

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32. During activation of charcoal -

A. O_2 is abrobed on charcoal

B. Moisture is absorbed on charcoal

C. Pre adsorbed material is desorbed

D. Charcoal is covered with insert gas

Answer: C

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33. The energy of molecules present on the surface of a substance is -

A. Equal to that of molecules is bulk

B. Greater than that of interior molecules

C. Less than that of interior molecules

D. Dependent on nature of substance

Answer: B

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34. Which of the following is not correct

A. Physical adsoption decreases in the increases in temperature

B. Physical adsorption is multi layered

C. Activation energy of physical adsorption is very high

D. Enthalpy change of physical adsorption is about $20KJmol^{-1}$

Answer: C

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35. The correct combination from the following given statements about chemisorption

I) It is unilayered adsorption

II) It is irreversible and takes place slowly

III) It occurs rapidly

The correct combination is

A. Both I and II are correct

B. Both II and III are correct

C. Both I and III are correct

D. All are correct

Answer: A

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36. Which of the following statement is incorrect regarding physisorptions?

A. More easily liquefiable gases are adsorbed readily

B. Under high pressure it results into multi mol,ecular layer on adorbent surface

C. Enthalpy of adesorption $(\Delta H_{\text{adsorption}})$ is low and positive

D. It occure because of van der Waal's forces

Answer: C

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37. The correct statements from the following about physical adsorption

I) desorption of adsorbate gas from adsorbent is not easy since chemical forces are involved

II) Its energy of activation is very low.

III)Easily liquifiable gases are more readily adsorbed.

A. All are correct

B. Only (II) and (III)

C. Only (I) and (III)

D. Only (I) and (II)

Answer: B

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38. The following are some statements about adsorption of solutes from the solutions.

A) Increase in the surface area of the adsorbent increases the extent of adsorption.

B) Increase in temperature decreases the extent of adsorption.

C) The extent of adsorption (x/m) is related to the molar concentration of solution (c) is given by $x/m = k.\ c^{1/n}$

The correct combination is

A. Only (A) and(C)

B. Only (B) and (C)

C. Only (A) and B

D. All are correct

Answer: D

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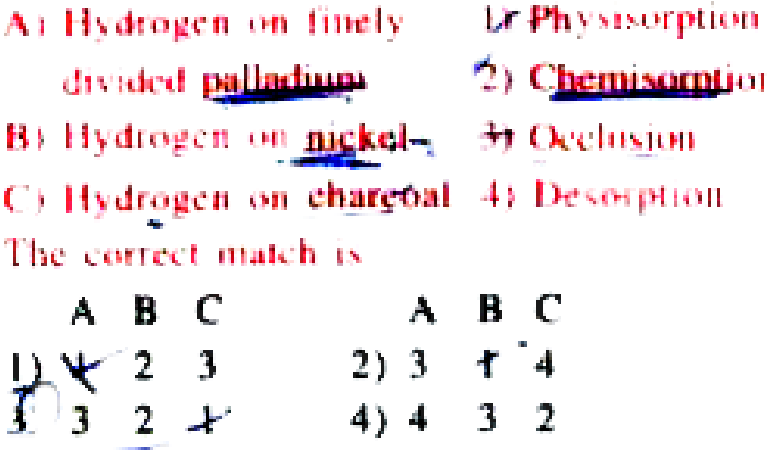
39. Concentration process



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40. Which of the following statements is incorrect with respect to physisorption?

A. The forces involved are van der Waal's forces

B. More easily liquefiable gases are adsorbed easily

C. Under high pressure it results into Multi-molecular layer on adsorbent surface.

D. $\Delta H_{ads \text{ or } ption}$ is high and positive

Answer: D

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41. Which one of the following is correct regarding physisorption?

A. Iti nvolves chemical bonds between adsorbent and adsorbate

B. Enthaly of adsorption is about 80-240kJ mol^{-1}

C. It is reversible in nautre

D. It results in unimolecular layer only on adsorbent surface under high pressure

Answer: C

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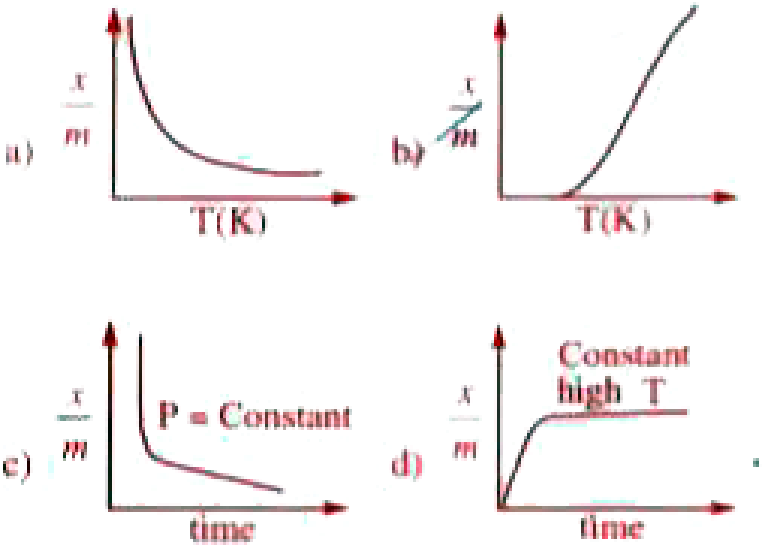
42. Which of the following represents chemisorption ? (x = The mass of the absorbate, m = Mass of the adsorbent)



A. a,b,d

B. a,c

C. b,d

D. b,c,d

Answer: C

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43. A catayst

A. Increases the average kinetic energy of reacting molecules

B. Increases the activation energy

C. Alters the reaction mechanism

D. Increases the frequency of collisions of reacting species

Answer: C

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44. The rate of a chemical reaction is increased in presence of a catalyst. This is because

A. Activation energy of the reaction is less in the new path

B. Heat of reaction is decreased

C. Threshold energy is increased

D. Activation energy of the new path is more

Answer: A

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45. In heterogeneous catalytic reactions involving solid catalyst and gaseous reactants, the catalysts, most generally used are

A. Metals

B. Metal oxides only

C. Transition metals only

D. Transition metals and transition metal oxides

Answer: D

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46. An inhibitor is essentially

A. A negative catalyst

B. An auto catalyst

C. A homogeneous catalyst

D. A heterogeneous catalyst

Answer: A

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47. The process which is catalysed by one of the products is called

A. Acid - base catalysis

B. Auto catalysis

C. Negative catalysis

D. Positive catalysis

Answer: B

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48. The catalyst used to increase the dissociation of H_2O_3 is

A. Acetanilide

B. Glycerol

C. H_3PO_4

D. Caustic soda

Answer: D

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49. Which of the following reactions is an example of heterogeneous catalysis

A. $2CO_{(g)} + O_{2(g)} \xrightarrow{NO(g)} 2CO_{2(g)}$

B. $2SO_{2(g)} + O_{2(g)} \xrightarrow{NO(g)} 2SO_{3(g)}$

C. $2CO_{(g)} + O_{2(g)} \xrightarrow{PT(s)} 2CO_{2(g)}$

D. $CH_3CHO_{(g)} \xrightarrow{I_2(g)} CH_{4(g)} + CO_g$

Answer: C

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50. A catalyst increases the rate of a reaction with out changing _____

A. Energy of activation

B. Heat of the reaction

C. Path of reaction

D. Mechanism of reaction

Answer: B

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51. Catalytic action of an enzyme is

A. Highly specific

B. Non specific

C. Does not depend on nature of substrate

D. Common for many biochemical reactions

Answer: A

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52. In which of these processes platinum is used as a catalyst ?

A. Oxidation of ammonia to form HNO_3

B. Hardening of oils

C. Production of synthetic rubber

D. Synthesis of methanol

Answer: A

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53. Which of the following catalyst is used for preparing toluene by reacting benzene with methyl chloride ?

A. Ni

B. Anhydrous $AlCl_3$

C. Pd

D. Pt

Answer: B

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54. A biological catalyst is

A. An amino acid

B. A carbohydrate

C. The nitrogen molecule

D. An enzyme

Answer: D

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55. During the cleaning action of soap - part of soap dissolves in the dirt and encapsulates to form micelle

A. Both hydrophyllic and hydrophobic

B. Hydrophyllic

C. Hrdrophobic

D. Cation

Answer: C

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56. Colloidal solution of gold prepared by different methods have different colours, because

A. Variable valencies of gold

B. Difference in the concentration of gold particles

C. Impurities produced by different methods

D. Difference in the diameter of colloidal gold particles

Answer: D

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57. Which of the following is an example of a heterogeneous catalytic reaction

A. $2SO_{2(g)} + O_{2(g)} \xrightarrow{NO(g)} 2SO_{3(g)}$

B. Hydrolysis of an aqueous solution of sugar in presence of a mineral acid

C. $2H_2O_{2(1)} \xrightarrow{pt(s)} 2H_2O_{(1)} + O_{2(g)}$

D. Hydrolysis o liquid ester in ther presence of aqueous mineral acid

Answer: C

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58. Which of the following is a lyophobic solution?

A. Aqueous starch solution

B. Aqueous solution

C. Gold sol

D. Polymer solutions in some organic solvents

Answer: C

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59. Which of the following is correct?

A. Catalyst undergoes permanent chemical change

B. Particle size of solute is a hydrosol

C. Hydrolysis of liquid ester in the presence of a mineral acid is an example of a heteroeneous catalytic reaction

D.

Answer: C

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60. Which of the following is an example for auto catalysis

A. $CH_3COOC_2H_5 + H_2O \rightarrow CH_3COOH + C_2H_5OH$

B. $N_2 + 3H_2 \rightarrow 2NH_3$

C. $2SO_2 + O_2 \rightarrow 2SO_3$

D. $C_{12}H_{12}O_{11} + H_2O \rightarrow C_6H_{12}O_6 + C_6H_{12}O_6$

Answer: A

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61. Match the following columns

Name of reaction	Catalyst
A) Hydrogenation of oils	1) Fe
B) Ostwald's process	2) Ni
C) Contact's process	3) V_2O_5
D) Haber's process	4) Pt

The correct match is

	A	B	C	D
1)	2	3	1	4
3)	3	1	4	2

	A	B	C	D
2)	2	3	4	1
4)	2	4	3	1

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62. According produces to the adsorption theory of catalysis, the speed of the reaction increases because

A. Adsorption produces heat which increases the speed of the reaction

B. Adsorption lowers the activation energy of the reaction

C. The concentration of reactant molecules at the active centres of the catalyst becomes high due to adsorption

D. In the process of adsorption, the activation energy of the molecules becomes large

Answer: B

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63. Which of the following is an example of homogeneous catalysis reaction?

1) $2SO_{2(g)} + O_{2(g)} \xrightarrow{NO_{(g)}} 2SO_{3(g)}$

2) Hydrolysis of aqueous sucrose solution in the presence of aquesous mineral acid

3) $2H_2O_{2(1)} \xrightarrow{Pt_{(s)}} 2H_{2(1)} + O_{2(g)}$

4) Hydrolysis of liquid ester in the presence of aqueous mineral acid

A. 2 and 4

B. 2 and 3

C. 1, 2 and 3

D. 1, 2 and 4

Answer: D

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64. Which of the following kind of catalysis can be explained by the adsorption theory?

A. Homogeneous catalysis

B. Acid - base catalysis

C. Hetero geneous catalysis

D. Auto catalysis

Answer: C

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65. Hydrogenation of vegetable oils in presence of finely divided Nickel as catalyst. The reaction is

A. Enzyme catalysed reaction

B. Homogeneous catalysis

C. Heterogeneous catalysis

D. Liquid catalysed reaction

Answer: C

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66. Which of the following statements is true

A. It accelerates reraction by decreasing the free energy of activation

B. It will be consumed in the reaction

C. It makes the reaction feasible by making ΔG° more negative

D. It makes the equilibrium constant of the reaction more favorable for the forward reaction

Answer: A

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67. Which of the following is not a colloid

A. Milk

B. Blood

C. Ice cream

D. Sugar solution

Answer: D

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68. What is the emulsifier in milk

A. Caesin

B. Gelatin

C. Albumin

D. Soap

Answer: A

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69. When the dispersion medium is alcohol, the collodal sol is known as

A. Hydrosol

B. Benzosol

C. Alcosol

D. Aquasol

Answer: C

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70. When dispersed phase is liquid and dispersion medium is a solid, the colloid is known as

A. A solution

B. An emulsion

C. A gel

D. A foam

Answer: C

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71. A colloidal solution in which a solid is dispersed in a liquid is called

A. Gel

B. Emulsion

C. Sol

D. Precipitate

Answer: C

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72. Blood is a colloidal solution of water containing

A. Liquid fat as dispersed phase

B. Albuminoid as dispersed phase

C. Butter as dispersed phase

D. Proteins as dispersed phase

Answer: B

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73. When the dispersed phase has a greater affinity for the dispersion medium, the colloids are termed as

A. Lyophilic

B. Lyophobic

C. Hydrophobic

D. Emulsion

Answer: A

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74. The disperse phase, dispersion media, and the nature of colloidal solution of gold sol respectively are

A. Solid, solid, Lyophobic

B. Liquid, liquid, lyophobic

C. Solid, liquid, lyophobic

D. Solid, liquid, lyophillic

Answer: C

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75. Soap emulsifies

A. Oil in water type

B. Water in oil type

C. Oil in oil type

D. Gel in oil

Answer: A

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76. The characteristic property of detergent :

A. Is it contains both hydrophilic and hydrophobic groups

B. Is it can act as an emulsifier

C. Is it enables water and oily substances to form emulusions

D. All the above

Answer: D

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77. The kind of colloid that does not exist

A. Solid in gas

B. Gas in solid

C. Solid in solid

D. Gas in gas

Answer: D

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78. Disperse phase and the dispersion media in blood respectively are (M-2007)

A. Liquid, solid

B. Liquid, liquid

C. Solid, liquid

D. Solid, solid

Answer: C

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79. The hydrophobic end of lauryl sulphate is

A. $C_{17}H_{35}$

B. $C_{17}H_{33}$

C. $C_{12}H_{25}$

D. $-OSO_3--$

Answer: C

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80. Among the electrolysis of Na_2SO_4, $CaCl_2$, $Al_2(SO_4)_3$ and NH_4Cl, the most effective coagulating agent for Sb_2S_3 sol is

A. Na_2SO_4

B. $CaCl_2$

C. $Al_2(SO_4)_3$

D. NH_4Cl

Answer: C

Watch Video Solution

81. What are non-polar and polar covalent bonds? Give examples.

A. Polar on outer surface and non polar on inner surface

B. Polar on inner surface and non polar on outer surface

C. Distributed over all the surface

D. Are persent on the surface only

Answer: A

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82. Milk is

A. Liquid is dispersed in liquid

B. Gas is dispersed in liquid

C. Sugar is dispersed in water

D. Solid is dispersed

Answer: A

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83. The migration of positively charged colloidal particles, under an electrical field towards the cathode is called

A. Electrophoresis

B. Electro-osmosis

C. Tyndall effect

D. Brownian movement

Answer: A

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84. Which of the following may form associate colloids?

A. Gold

B. Soap

C. Starch

D. Glucose

Answer: B

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85. Which of the following is not correct?

A. Milk is naturally occuring emulsion

B. Gold sol is a lyophilic sol

C. Physical adsorption decreases with rise in temperature

D. Chemical adsorption is unilayered.

Answer: B

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86. Most common emulsifier for vegetable oil, water emulsion is ---

A. Carbon powder

B. HgI_2

C. Soap

D. Lyphobic colloid

Answer: C

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87.

LIST - 1	LIST - 2
A) Colloidal	1) Liquid or solid or gas
B) Crystalloid	2) 1 mμ - 1 μ
C) True solution	3) Does not show Tyndall effect
D) Disperse phase	4) Urea
	5) Either liquid or gas but should not be solid

	A	B	C	D
1)	2	4	5	5
3)	5	1	3	2

	A	B	C	D
2)	2	3	4	1
4)	2	4	3	1

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88.

LIST - 1 [Colloidal solution]	LIST - 2 [Example]
A) Liquid in gas	1) Milk
B) Solid in gas	2) Boot polish
C) Liquid in liquid	3) Smoke
D) Solid in liquid	4) Cloud
	5) Gold sol

	A	B	C	D
1)	4	3	2	
2)	2	1	5	4
3)	3	3	2	5
4)	1	4	3	2

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89. Solid aerosol is an example of colloidal system of

A. Liquid dispersed in gas

B. Liquid dispersed in gas

C. Solid dispersed in gas

D. Solid dispersed in liquid

Answer: C

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90. Colloidal solution of gold prepared by different methods have different colours, because

A. Variable valency of gold

B. Different concentrations of gold particles

C. Impurities produced by different mentods

D. Different diameters of colloidal gold particle

Answer: D

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91. The process of separating a crystalloid, from a colloid by filtration, is called

A. Emulsification

B. Dialysis

C. Coagulation

D. Peptization

Answer: B

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92. Which of the following type of molecules form micelles?

A. Non-polar molecules

B. Polar molecules

C. Surfacant molecules

D. All of these

Answer: C

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93. Colloidal solution of silver is prepared by

A. Bredig's are method

B. Peptization

C. Colloidal milk

D. Double decomposition method

Answer: A

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94. If gold number of A, B, C and D are 0.005, 0.05, 0.5 and 5 respectively, then which of the following will have the greatest protective value?

A. A

B. B

C. C

D. D

Answer: A

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95. The concentration of electrolyte required to coagulate a given amount of As_2S_3 solution is minimum in case of

A. Potassium sulphate

B. Aluminium nitrate

C. Magnesium nitrate

D. Potassium nitrate

Answer: B

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96. The bleeding from a wound is stopped by the application of ferric chloride as

A. Blood starts flowing in the opposite direction

B. Ferric chloride seals the blood vessels

C. Blood reacts and a solid is formed which seals the blood vessels

D. Blood is coagulated and the blood vessels are sealed

Answer: D

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97. Colloidal solution commonly used in the treatment of eye disease is

A. Colloidal silver

B. Clloidal gold

C. Colloidal antimony

D. colloidal sulphur

Answer: A

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98. Which one of the following is not a surfactant ?

A. $CH_3 - (CH_2)_{15} - N^+(CH_3)_3Br^-$

B. $CH_3 - (CH_2)_{14} - CH_2 - NH_2$

C. $CH_3 - (CH_2)_{16} - CH_2OSO_2\bar{N}a^+$

D. $OHC - (CH_2)_{14} - CH_2 - COO - Na^+$

Answer: B

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99. The simplest way to check whether a system is colloidal

A. Tyndall effect

B. Browmain movement

C. Electrodialysis

D. Finding out particle size

Answer: A

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100. Particles of which of the following donot pass through ultra filter paper

A. Colloids only

B. True solutions

C. Suspensions only

D. Colloids and suspension

Answer: D

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101. Some statements are given below about lyophillic sol

I) These are solvent hating colloidal solutions

II) These are very stable.

III) All high molecular weight carbon compounds form in water, lyophillic sols.

The correct combination is

A. Both I and II are correct

B. Both II and III are correct

C. Both I and III are correct

D. All are correct

Answer: B

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102. The tyndall effect in colloidal solutions is due to

A. Scattering of light

B. Reflection of light

C. Absorption of light

D. Electrically charge of particles

Answer: A

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103. Which of the following is a homogeneous system?

A. Suspension

B. Colloid solution

C. True solution

D. Starch solution

Answer: C

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104. Colloidal systems are

A. Homogeneous

B. Heterogeneous

C. Suspensions

D. Transparent

Answer: B

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105. The number of phases in a colloidal system is -

A. 1

B. 2

C. 3

D. 4

Answer: B

106. The following are some statements about micelles

I) These are formed as aggregated particles when soap is applied at lower concen trations

II) The tail part of it dissolves the grease deposit or dirt.

III)Hydrocarbon chain of soap micelle is hydrophillic end and its anion part is hydrophobic end.

The correct combination is

A. All are correct

B. Only I and II

C. Only II and III

D. Only II

Answer: D

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107. When dispersed phase is solid and dispersion medium is gas, the colloidal system is

A. Smoke

B. Clouds

C. Emulsion

D. Milk

Answer: A

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108. Sulphur sol contains

A. Discrete S-atoms

B. Discrete S-molecules

C. Large aggregate of S-molecule

D. Water dispersed in solid sulphur

Answer: C

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109. Which one of the following statements is noy correct ?

A. Plant latex is colloidal solution of rubber particles which are negatively charged

B. Haemoglobin is a positively charged sol

C. On prolonged dialysis the colloid is stabilized

D. The process of settling down of colloidal particle of coagulation

Answer: C

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110. Glid sol is not a

A. Lyophobic sol

B. Negatively charged sol

C. Macromolecular sol

D. Multimolecular colloid

Answer: C

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Objective Excersice - 2

1. Which of the following is not considered as absorption

A. Chalk piece dipped in ink

B. Sponge placed in water

C. Finely divided charcoal stirred with dilute acetic acid

D. H_2 gas in contact with finely divided Pd

Answer: C

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2. Which of the following gases is adsorbed easily and more on activated charcoal

A. $CO_2(T_c = 304K)$

B. $SO_2(T_c = 430K)$

C. $H_2(T_c = 23K)$

D. All gases adsorp to the extent

Answer: B

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3. Adsorption isotherm of gases on solids give the relation between

A. Volume of adsorbent and temperature

B. Amount of adsorbent per unit weight of adsorbate and pressure

C. Amount of adsorbate per unit of weight of adsorbent and equilibrium pressure

D. Volume of adsorbate and pressure

Answer: C

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4. Amount of gas adsorbed per gram of adsorbent increases with pressure but after certain limit is reached, adsorption becomes constant. It is when

A. Multilayers are formed

B. Desorption takes place

C. Temperature is increased

D. Adsorption also starts

Answer: A

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5. Favourable conditions for physical adsorption are

A. Low T, high P

B. High T, high P

C. Low T, low P

D. Low T, low P

Answer: A

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6. In an adsorption experiment a graph between log x/m vs. log p is found to be linear with a slope of 45°. The intercept on the log x/m axis was found to be 0.3010. What is x/m If presure is 0.6 bar $(\tan 45^\circ = 1)$

A. 0.6

B. 1.2

C. 2.4

D. 0.3

Answer: B

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7. Which are of the following is a case of adsoption ?

A. Anhydrous $CaCl_2$ in contact with water vapour

B. Silica gel in contact with water vapours

C. Ammonia gas in contact with water

D. Cotton clothes dipped in a dye solution

Answer: B

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8. The volumes of gases H_2, CH_4, CO_2 and NH_3 adsorbed by one gram of charcoal at 288K are in the order

A. $H_2 > CH_4 > CO_2 > NH_3$

B. $CH_2 > NH_3 > H_2 > CH_4$

C. $NH_3 > CO_2 > CH_4 > H_2$

D. $CH_4 > CO_2 > NH_3 > H_2$

Answer: C

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9. Which one of the following is not an application of adsorption ?

A. Ion exchange process in softening of hard water

B. Chromotographic analysis

C. Clarification of sugar

D. Theory of homogeneous catalysis

Answer: D

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10. Which of the following is less than zero during adsorption?

A. ΔG

B. ΔS

C. ΔH

D. All the above

Answer: D

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11. The rate of physisorption

A. decreases with increase of pressure

B. is independent at high pressure

C. is maximum at one atmospheric pressure

D. increases with increases of pressure

Answer: B

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12. Which one of the following is not a correct statement ?

A. Physical adsorption is reversible in nature

B. Physical adsorption involves van der Waal's forces

C. Rate of physical adsorption increases with increase of pressure on the adsorbate

D. High activation energy is involved

Answer: D

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13. Rate of physisorption increases with

A. Incresaes in T

B. Decreases in P

C. Decreases in T

D. Decrease in surface area

Answer: C

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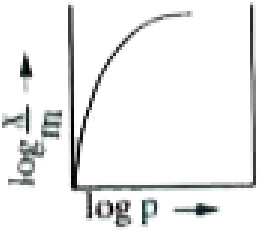
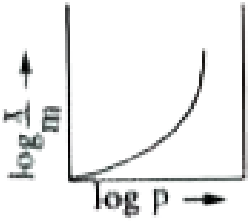
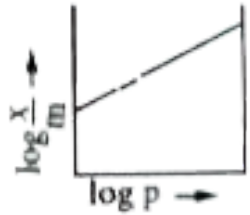
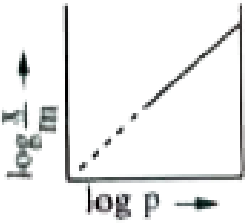
14. Which of the following curve is in accordance with Freundlich adsorption isotherm ?

A. 

B. 

C. 

D. 

Answer: C

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15. The slope and intercept respectively of the graph drawn between $\frac{\log(x)}{m}$ and logP in respect of the logarithmic form of Freundlich adsorption isotherm are

A. $n, \frac{\log(1)}{K}$

B. $\frac{1}{n}, \log K$

C. $\log n, \frac{1}{K}$

D. $n, \log K$

Answer: B

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16. In the Freundlich isotherm $\left(\frac{x}{m} = k_p^{1/n}\right)$ plot of log $\frac{x}{m}$ vs log p, the intercept is (where, x,m,p and k are mass of the gas, mass of adsorbent, pressure and constant which depend on the nature of the adsorbent, respectively)

A. k

B. logk

C. e^k

D. In $\frac{1}{k}$

Answer: C

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17. $CH_3COCl + H_2 \xrightarrow[\text{quinoline}]{Pd/BaSO_4} CH_3CHO.$

Here quinoline acts as

A. Catalyst

B. Catalyst poison

C. Promoter

D. Medium

Answer: B

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18. Lock-Key' fit theory is for

A. Homogeneous catalysis

B. Heterogeneous catalysis

C. Enzyme action

D. None of these

Answer: C

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19. When an acid solution of oxalic acid at $80^{\circ}C$ is titrated with $KMnO_4$ solution, the first few drops of $KMnO_4$ are decoloured slowly but decolourisation occurs fast later. This is because

A. Of increases in the concentration of CO_2 formed

B. One of the products Mn^{+2} acts as auto catalyst

C. Both Mn^{+2} and K^{+} ions act auto catalyst

D. $KMnO_4$ catalyses the reaction at the later stages

Answer: B

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20. The magnetic moment of autocatalyst formed in the reaction between acidified oxalic acid and potassium permanganate

A. 5.9 B.M

B. 4.9 B.M

C. 3.9 B.M

D. 2.8 B.M

Answer: A

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21. Which one of the following statements is incorrect in the case of heterogeneous catalyst ?

A. The catalyst lowers the energy of activation

B. The catalyst actually forms a compound with the reactant

C. The surface of the catalyst plays a very important role

D. There is no change in the energy of activation.

Answer: D

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22. A catalytic poison renders the catalyst ineffective because :

A. It is preferentially adsorbed on the catalyst

B. It adsorbs the molecules of the reactants

C. It combines chemically with the catalyst

D. It combines with one of the reactants

Answer: A

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23. In heterogeneous catalytic reactions, catalyst in the finely divided form possesses higher catalytic reactivity. This is because

A. Surface area of the finely divided catalyst

B. Surface area of the catalyst in the lump form is large

C. Finely divided catalyst has more internal energy in it

D. Finely divided catalyst has stable surface

Answer: A

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24. Zeolites have shape slectivity depending on

A. Atomic structure

B. Pore structure

C. Molecular structure

D. None of these

Answer: B

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25. Shape selective catalysis are known by this name because

A. Due of the shape of catalyst

B. The specificity of catalyst

C. The size of pores of the catalyst can trap only selective species

D. It depends on selectivity of catalyst

Answer: C

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26. Which of the following processes does not involve a catalyst

A. Haber's process

B. Thermit process

C. Ostwald's process

D. Contact process

Answer: B

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27. Which of the following is incorrect?

1) Catalyst undergoes permanent chemical change

2) Particle size of solute in true solutions is 10^{3-} m

3) Starch solution is a hydrosol

4) Hydrolysis of liquid ester in the presence of mineral acid is an example of heterogeneous catalysis reactions

A. 1, 2 and 3

B. 2 and 3

C. 1, 2 and 4

D. 2, 3 and 4

Answer: C

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28. The catalyst used in the dehydration of ethylalcohol to ethene is

A. Al_2O_3

B. Sb_2O_3

C. $As_2\_O_3$

D. Cu

Answer: A

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29. Reactions in Zeolite catalyst depend on,

A. Pores

B. Apertures

C. Size of cavity

D. All of these

Answer: D

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30. In colloidal state particle size ranges from

A. 1 - 10 Å

B. 20 - 50 Å

C. 10 - 1000 Å

D. 1 - 280 Å

Answer: C

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31. Which is used for ending charge on colloidal solutions

A. Electrons

B. Electrolysis

C. Positive charged ions

D. Compounds

Answer: B

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32. In Faraday-Tyndall effect the colloidally suspended particles

A. Trace out the path of strong beam of light

B. Undergo coagulation

C. Show electrophoresis

D. Show brownian movement

Answer: A

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33. Which of the following form micellies in aqueous solution above critical concentration

A. Glucose

B. Urea

C. Dodecyl trimethyl ammonium chloride

D. Pynidum chloride

Answer: C

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34. A micelle formed during the cleansing action by soap is

A. A discrete particle of soap

B. Aggeregated particles of soap and dirt

C. A discrete particle of dust

D. An aggregated particle of dust and water

Answer: B

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35. Smoke, cloud and gold sol are respectively

A. Aerosol, Hydosol and Aquasol

B. Hydrosol, Hydrosol and Hydrosol

C. Aquasol, Aerosol and Hydrosol

D. Aerosol, Aerosol and Hydrosol

Answer: D

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36. When an excess electrolyte is added to a colloidal sol it

A. Gets coagulated

B. Is ionised

C. Becomes stable

D. Gets purified

Answer: A

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37. On addiction of 1ml solution of 10% NaCl to 10ml gold sol in the presence of 0.0250gm mof starch, the coagulation is just prevented Starch has the following gold number

A. 0.025

B. 0.25

C. 2.5

D. 25

Answer: D

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38. Which electrolyte is least effective in causing coagulation of +ve ferric hydroxide sol?

A. Kbr

B. K_2SO_4

C. K_2CrO_4

D. $K_3\left[Fe(CN)_6\right]$

Answer: A

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39. Gelatin is often used as an ingredient in the manufacture of ice-cream. The reason for this is

A. Causing the mixture to solidly

B. Improving the flavour

C. Stabilising the colloidal solution and preventing the crystal growth

D. Preventing formation of colloid

Answer: C

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40. A colloidal solution is subjected to an electrical field. The particles move towards anode. The coagulation of same sol is studied using NaCl, $BaCl_2$ and $AlCl_3$ solutions. Their coagulating power should be

A. $NaCl > BaCl_2 > AlCl_3$

B. $BaCl_2 > AlCl_3 > NaCl$

C. $AlCl_3 > BaCl_2 > NaCl$

D. $BaCl_2 > NaCl > AlCl_3$

Answer: C

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41. What is the main cause for charge on a colloidal solution ?

A. Electrons

B. Electrolytes

C. Non-electrolytes

D. Compounds

Answer: B

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42. A substance which forms micelles in solutions contains

A. Carboxylic group

B. Alkyl group

C. Water insoluble long hydrocabon groups and water soluble polar groups

D. Water soluble hydrocarbon group and water insoluble polar group]

Answer: C

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43. Arsenic (III) sulphide form a sol with a negative charge which of the following ionic substances should be most effective in coagulating the sol

A. KCl

B. $MgCl_2$

C. $Al_2(SO_4)_3$

D. Na_3PO_4

Answer: C

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44. A negatively charged suspenstion of clay in water needs for precipitation the minimum amount of

A. $AlCl_3$

B. K_2SO_4

C. NaOH

D. HCl

Answer: A

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45. A colloidal sol $Fe(OH)_3$ in water is

A. A hydrophilic colloid

B. A hydrophobic colloid

C. An emulsion

D. None of these

Answer: B

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46. Lyophilic sols are more stable than lyophobic sols because

A. The colloidal particles have positive charge

B. The colloidal particle have negative charge

C. The colloidal particle are solvated

D. There are strong electrostatic repulsions between the negatively charged colloidal particles

Answer: C

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47. Ultra microscope works on the principle of

A. Light reflection

B. Light absorption

C. Light scattering

D. Light polarization

Answer: C

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48. Celllulose dispersed in ethanol is called

A. Emulsion

B. Micelle

C. Collodion

D. Hydrophiliic sol

Answer: C

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49. Gelatin protects

A. Gold sol

B. As_2S_3

C. $Fe(OH)_3$

D. All the above

Answer: D

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50. The coagulation of colloidal particles of the sol can be caused by

A. Heating

B. Adding oppositly charged sol

C. Adding electrolyte

D. All the above

Answer: D

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51. In the coagulating of a positive sol, flocculation powers of Cl^-, SO_4^{-2} and PO_4^{-3} are in the order

A. $Cl > SO_4^{-2} > PO_4^{-3}$

B. $Cl > PO_4^{-3} > SO_4^{-2}$

C. $PO_4^{-3} > SO_4^{-2} > Cl$

D. $PO_4^{-3} > Cl > SO_4^{-2}$

Answer: C

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52. The coagulating power of an electrolyte for Aresenious sulphide sol decreases in the order

A. $Na^+ > Al^{3+} > Ba^{2+}$

B. $PO_4^{3-} > SO_4^{2-} > Cl^-$

C. $Cl^- > SO_4^{2-} > PO_4^{3-}$

D. $Al^{3+} > Be^{2+} > Na^+$

Answer: D

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53. Which of the following is an example of zeolite

A. $MgCl_2$

B. $Ca(OH)_2$

C. $ZSM - 5$

D. CAN

Answer: C

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54. The dispersed phase in colloidal iron (iii) hydroxide and colloidal gold positively and negatively charged respectively which of the following statement is not correct

A. $MgCl_2$ solution can coagulate the gold sol more readily than the iron (III) hydroxide sol

B. Na_2SO_4 causes coagulating in both sols.

C. Mixing the two sols has no effect

D. Coagulating of both the sols can be brought about by electrophoresis

Answer: D

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55. The process of removing dissolved impurities from a colloidal system, by means of deffusion through suitable membrane under the influence of an electric field is called

A. Electro osmosis

B. Electrophoresis

C. Electrodialysis

D. Peptization

Answer: C

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56. As the size of gold particle increases the colour of solution varies as

A. Purple $\rightarrow$ blue $\rightarrow$ golden $\rightarrow$ red

B. Golden $\rightarrow$ red $\rightarrow$ purple $\rightarrow$ blue

C. Red $\rightarrow$ purple $\rightarrow$ blue $\rightarrow$ golden

D. Blue $\rightarrow$ purple $\rightarrow$ golden $\rightarrow$ red

Answer: C

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57. Which one of the following forms a negativity charged sol?

A. $Al_2O_3 . xH_2O$

B. $Cr_2O_3 . xH_2O$

C. TiO_2

D. Cds

Answer: D

Watch Video Solution

58. The order of coagulating power of PO_4^{3-}, SO_4^{2-} and Cl^- in the coagulating of a given positive sol is

A. $PO_4^{3-} > SO_4^{2-} > Cl^-$

B. $SO_4^{2-} > Cl^- > PO_4^{3-}$

C. $Cl^- > PO_4^{3-} > SO_4^{2-}$

D. $Cl^- > SO_4^{2-} > PO_4^{3-}$

Answer: A

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59. Which of the following is correct about lyophillic sol ?

A. They are irreversible

B. They are formed by inorganic substances

C. They are readily co-ogulated by addition

D. They are self stablised

Answer: D

Watch Video Solution

60. Peptization denots

A. Digestion of food

B. Hydrolysis of proteins

C. Breaking and dispersion of precipitate into the colloidal state

D. Precipitaiton of solid from colloidal dispersion

Answer: C

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61. The migration of colloidal solute particles in a colloidal solution, when an electric current is applied to the solution is known as

A. Brownian movement

B. Electro osmosis

C. Electrophorsis

D. Electrodialysis

Answer: C

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62. Blue colour of the sky is due to

A. Scattering of blue light by dust particles

B. Scattering of the blue light by water

C. Scattering of blue light by dust particles and water

D. None of the above

Answer: C

Watch Video Solution

63. The order of coagulating power of PO_4^{3-}, SO_4^{2-} and Cl^- in the coagulating of a given positive sol is

A. $PO_4^{3-} > SO_4^{2-} > Cl^-$

B. $SO_4^{2-} > Cl^- > PO_4^{3-}$

C. $Cl^- > PO_4^{3-} > SO_4^{2-}$

D. $Cl^- > SO_4^{2-} > PO_4^{3-}$

Answer: A

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64. On adding $AgNO_3$ solution to KI solution, a negatively charged colloidal sol will be formed in which of the following conditions ?

A. 100 mL of 0.1 M $AgNO_3 + 100mL$ of 0.1 M KI

B. 100 mL of 0.1 M $AgNO_3 + 50mL$ of 0.2 M KL

C. 100 mL of 0.2 M $AgNO_3 + 100mL$ of 0.1 M KI

D. 100 mL of 0.1 M $AgNO_3 + 100mL$ of 0.15 M KI

Answer: D

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65. On addiction of 1ml solution of 10% NaCl to 10ml gold sol in the presence of 0.0250gm mof starch, the coagulation is just prevented Starch has the following gold number

A. 0.25

B. 0.025

C. 2.5

D. None of these

Answer: D

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66. Hardy - Schulz rules are based on _____ of electrolyte ions coagulating the colloid

A. Size

B. Charge

C. Magnetic nature

D. Molar mass

Answer: B

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67. Which of the following is a kinetic property of sols ?

A. Electrophoresis

B. Browmain movement

C. Tyndall effect

D. Peptisation

Answer: B

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68. Brownian movement is mainly is due to

A. Attraction between dispersion medium and dispersed phase particles

B. Unbalanced impact of the dispersion medium on colloidal particles

C. Scattering of light on sol particles

D. Repulsion of colloidal particles by protective colloids

Answer: B

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69. Which of the following is a non electrolytic colloidal sol

A. Starch

B. AgCl sol

C. Arsenic sulphide sol

D. $Sb_2S_3 sol$

Answer: A

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70. Sodium stearate forms associated colloids

A. Due to association of Na^+ ions

B. Due to dissociation of stearate ion

C. Due to orientation of hydrocarbon chain to wards centre of the micelle and COO^- groups towards water

D. Due to orientation of COO^- groups towards center of the micelle and hydrocarbon chain towards water

Answer: C

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71. Gold number of a lyophilic solution is such property that

A. The larger its value, the greater is the peptising power

B. The lower its value, the greater is the peptising power

C. The lower its value, the greater is the protecting power

D. The lower its value, the greater is the protecting power

Answer: A

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72. Ferric chloride on rubbing to a bleeding wound causes

A. Coagulation

B. Peptisation

C. Emulsification

D. De-emulsification

Answer: C

Watch Video Solution

73. An example of a positively of a positively charged sol is

A. CdS sol

B. Starch sol

C. Haemoglobin

D. Gold sol

Answer: C

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74. When the purc solvent diffuses out of the solution through the semi-permeable membrane then the process is called

A. Sorption

B. Dialysis

C. Reverse osmosis

D. Osmosis

Answer: C

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75. If the gold number of potato starch is 25, how many grams of it is required to prevent coagulating of 100mL of gold sol on adding 10mL of

10% NaCl solution?

A. 0.3

B. 0.5

C. 0.25

D. 0.4

Answer: C

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Objective Excersice - 3 (PREVIOUS NEET/AIPMT QUESTIONS)

1. Which of the following forms cationic micelles above certain concentrations ?

A. Sodium dodecyl sulphate

B. Urea

C. Sodium acetate

D. Cetyl trimethyl ammonium bromide

Answer: D

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2. If x is amount of adsorbate and m is amount of adsorbent, which of the following relations is related to adsorption process ?

A. x/m = $p \times T$

B. x/m = f(P) at constant T

C. x/m = f(T) at constant P

D. P = f(T) at constant (x/m)

Answer: B

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3. The Langmuir adsorption isotherm is deduced using the assumption

A. The adsorption sites are equivalent in their ability to adsorb particles

B. The heat of adsroption varies with coverage other

C. The adsrobed molecules interact with each other

D. The adsorption takes palace in multiayes

Answer: A

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4. Catalyst

A. Lower activation energy

B. Increases activation energy

C. May increase or may decrease activation energy

D. Brings out equilibrium

Answer: A

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5. Which one of the following statements in incorrect about enzyme catalysis ?

A. Enzymes are denatured by ultraviolet rays and at light temperature

B. Enzymes are least reactive at optimum temperature

C. Enzymes are mostly proteinous in nature

D. Enzyme action is specific

Answer: B

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6. In freundlich adsorption isotherm, the value of 1/n is

A. 1 in case of physical adsorption

B. 1 in case of chemisorption

C. Between 0 and 1 in all cases

D. Between 2 and 4 in all cases

Answer: C

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7. The protecting power of lyophilic colloidal solution is expressed in terms of

A. Critical micelle concentration

B. Oxidation number

C. Coagulation value

D. Gold number

Answer: D

View Text Solution

8. Which of the following statements is correct for spontaneous adsorption of a gas ?

A. ΔS is negative and therefore, ΔH should be highly positive

B. ΔS is negative and therefore, ΔH should be highly negative

C. ΔS is positive and therefore, ΔH should be negative

D. ΔS is positive and therefore, ΔH should also be highly positive

Answer: B

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9. The coagulation values in millimoles per litre of the electrolytes used for the coagulation of As_2S_3 are given : I. (NaCl) = 52

II. $(BaCl_2) = 0.69$ " " III. $(MgSO_4) = 0.22$

Correct order of their coagulating power is

A. IgtIIgtIII

B. IIgtIgtIII

C. IIIgtIIgtI

D. IIIgtIgtII

Answer: C

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10. Which property of colloids is not dependent on the charge on colloidal particles ?

A. Tyndal effect

B. Coagulation

C. Electrophorsesis

D. Electro-osmosis

Answer: A

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11. Which one of the following statements is not correct ?

A. Coenzymes increase the catalytic activity of enzyme

B. Catalyst does not initiate any reaction

C. The value of equilibium constant is changed in the presence of a catalyst in the reaction at equilibrium

D. Enzymes catalyse mainly bio-chemical reactions

Answer: C

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12. On which of the following properties does the coagulating power of an ion depend ?

A. Both magnitude and sign of the charge on the ion

B. Size of the ion alone

C. Magnitude of the charge on ion alone

D. The sign of charge on the ion alone

Answer: C

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Objective Excersice - 4 (ASSERTION (A)& REASON (R) TYPE QUESTION)

1. (A) De-emulsification is a reverse process of emulsion formation

(R) During de-emulsification , the emulsion breaks to give oil and water.

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: A

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2. (A) Adsorption is endothermic

(R) Adsorption process is accormpanied by increase in randomness

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: D

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3. (A) A gas with higher critical temperature is adsorbed more than a gas with lower critical temperature

(R) At higher temperature the gas is more easily liquefiabe

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: B

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4. (A) SO_2 gas is easily liquified while H_2 is difficult to liquify .

(R) SO_2 has low critical temperature while H_2 has high critical temperature.

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: C

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5. (A) Adsorption is a surface phenomenon.

(R) Adsorption is an exothermic proces.

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: B

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6. (A) Physisorption is not specific.

(R) Physisorption involves Vanderwaal's forces only between the adsorbent and adsobate, which are non-specific

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: A

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7. (A)Milk is a naturally occuring stable emulsion . (R) Milk is an example of oil in water type emulsion

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: B

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8. (A)Same reactants give different products with different catalysts.

(R) Catalyst is highly specific or selective.

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: A

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9. (A)Charcoal is a good adsorbent

(R) Charcoal has highly porous structure.

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: A

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10. (A)Water vapours are absorbed by anhydrous calcium chloride

(R) Absorption and adsorption are similar processes.

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: C

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11. (A)Enthalpy of physical adsorption is lower than chemical adsorption

(R) Molecules of adsorbate and adsorbent are held together by vanderwall forces in physical adsorption and by chemical bonds in chemical adsorption

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: A

View Text Solution

12. (A)The reaction of oxalic acid with acidified $KMnO_4$ first slow and then proceeds with faster speed

(R) Acidified $KMnO_4$ is a strong oxidizing agent

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: B

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13. (A)In Haber's synthesis, the rate of formation of NH_3 is increased by adding Fe.

(R) Fe acts as catalyst for Haber's synthesis.

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: A

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14. (A)Catalyst increases the rate of reaction.

(R) Catalyst functions by lowering the energy of activation.

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: A

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15. (A)A catalyst does not alter the equilibrium constant of a reaction

(R) The catalyst forms a complex with the reactants and provides an alternate path with lower energy of activation for the reaction. The forward and the backward reactions are affected to the same extent.

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: A

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16. (A) NH_3 adsorbs more readily over activated charcoal than CO_2

(R) NH_3 Is non polar

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: C

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17. (A) : Gases between themselves cannot form a colloidal solution.

(R): Gases give homogenous mixture

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: A

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18. (A) Colloidal sols scatter light while true solutions do not.

(R) The paricals in the colloidal sol move much slower than that of the true solution

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: B

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19. (A) Colloidal particles show Brownian Movement

(R) Brownian movement arises because of the impact of the molecules of the dispersion medium with the colloidal particles.

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: A

Watch Video Solution

20. (A) A colloidal sol of As_2S_3 is coagulated faster by 0.1 M $BaCl_2$ than by 0.1 M $NaCl$. (R)BaCl_(2)$givessame\nu mberof$Cl^(-)` ions than NaCl

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: D

View Text Solution

21. (A)Colloidal solutions are stable but colloidal particles do not settle down

(R) Brownian movement counters the force of gravity actively on colloidal particles

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: A

Watch Video Solution

22. (A) An emulsion becomes stable if saop is added to it.

(R) Saop contains hydrophilic and hydrophobic parts.

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: A

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23. (A) Milk is an example of water in oil emulsions

(R) Emulsions contains liquid dipersed in solid

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: D

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24. (A) Urease catalyses the hydrolysis of urea.

(R) All catalysts are enzymes.

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: C

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25. (A) Enzyme catalysed reactions are of first order.

(R) Enzyme never undergoes any change.

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: D

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26. (A)Adsorption is a surface phenomenon.

(R) During adsortion, residual force of surface decreases

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: B

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27. (A) Conversion of fresh precipitate to colloidal state is called peptization

(R) It is caused by the addition of common ions

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: B

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28. (A) Zeolites are good shape-selective catalysts

(R) Zeolites have honeycomb - like structures

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: B

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29. (A)Increase in surface area increases rate of evaporaton

(R) Stronger the intermolecular force faster rate of evaportion at a given temperature

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: C

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30. (A) Substances whose solutions cannot pass through filter paper are called as colloids.

(R) The size of collidal particles are larger than the size of suspension particles.

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: D

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31. (A) In chemisorption , adsorption keeps on increasing with temperature

(R) Heat keeps on providing more and more activation energy

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: D

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32. (A)Lyophilic colloids are called as reversible sols.

(R) Lyophilic sols are liquid loving .

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: B

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33. (A)A colloidal sol of $Fe(OH)_3$ formed by peptisation carries positive charge.

(R) During formation of $Fe(OH)_3$ sol , electrons are lost by the particles.

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: C

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34. (A) ZSM-5 is used as a catalyst is petrochemical industries .

(R) Zeolites are three dimensional network silicates in which some silicon atoms are replaced by aluminium atom.

A. Both (A) and (R) are true and (R) is the correct explanation of (A)

B. Both (A) and (R) are true and (R) is not the correct explanation of (A)

C. (A) is true but (R) is false

D. Both (A) and (R) are false

Answer: B

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