CHEMISTRY

FOR IIT JEE ASPIRANTS OF CLASS 12 FOR CHEMISTRY

SURFACE CHEMISTRY

Check Your Grasp

1. How is AC different from DC?

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2. What is the effect of surface area on adsorption?

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3. Why is adsorption always exothermic ?

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4. What is the effect on entropy change $(\triangle S)$ in adsorption?

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5. Why are powdered substance more effective adsorbent than their crystalline forms?

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6. CHEMISORPTION

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7. What is the effect of surface area on adsorption?

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8. What is the equation form of Langmuir adsorption isotherm undre high pressure?

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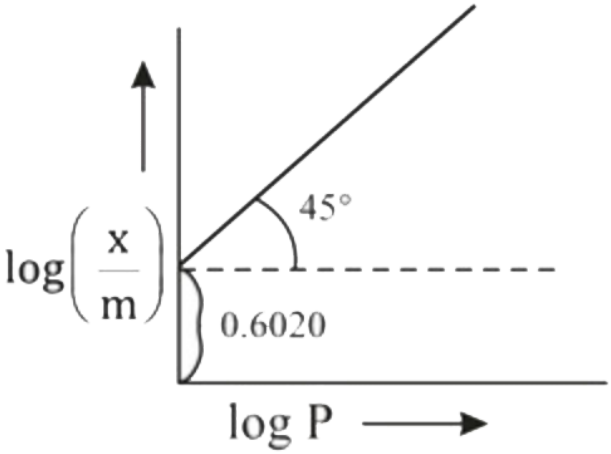
9. Graph between $\log\left(\frac{x}{m}\right)$ and $\log P$ is straight line at angle of 45° with the intercept of 0.6020.



The extent of adsorption $\left(\frac{x}{m}\right)$ at a pressure of 1 atm is

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10. Why dows physisoption decrease with increase of temperature ?

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11. One gram of charcoal adsorbs 400 mL of 0.5 M acetic acid to form a mono layer and the molarity of acetic acid reduces to 0.49. Calculate the surface area of charcoal adsorbed by each molecule of acetic acid. The surface area of charcoal is $3.01 \times 10^2 m^2 g^{-1}$.

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12. The pressure of a gas is $2.5 atm$. Calculate the value in torr.

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13. Why is ester hydrolysis slow in the beginning and becomes fast after sometime ?

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14. What do you mean by activity and selectivity of catalysts ?

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15. What is the role of desorption in the process of catalysis?

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16. What are enzyme inhibitors ?

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17. What do you mean by specification of a bulb or other electric appliances ?

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18. Which of the following reactions is an examples of homogeneous catalysis ?

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

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20. Optimum temperature for photosynthesis is

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21. Which enzyme converts milk into curd?

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22. Which type of compound can form micelles? Give example

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23. What are lyophilic and lyophobic sols?Give one example of each type ? Why is hydrophobic sol easily coagulated ?

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24. Comment on the statement that colloid is not a substance but state of a substance

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25. Classify the following colloid i) smoke ii) cloud iii) blood iv) milk v) starch vi) gold sol

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26. The cause of Brownian-movement is

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27. What is electrophoresis give its application give its application ?

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28. What is co- ogulating powers ?

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29. Why true solutions do not exhibit tyndall effect?

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30. Define coagulation value.

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31. What is most accepted reason for the presence of charge on colloids?

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32. On addition of $1mL$ solution of $10\,\%\,NaCl$ to $10mL$ gold sol in the presence of $0.0250g$ of starch, the coagulation is just prevented. What is the gold number of starch?

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33. For the coagulation of $100mL$ of arsenious sulphite sol, $5mL$ of $1MNaCl$ is required. What is the flocculaton value of $NaCl$?

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Evaluate Yourself 1

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

A. Adsorber

B. Absorber

C. Adsorbent

D. Adsorbate

Answer: C

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2. Adsorption is multilayer in case of :

A. Physical adsorption

B. Chemisorption

C. Both (1) & (2)

D. None of these

Answer: A

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3. Physical adsorption is :

A. Involves the weak attractive interaction between the adsorbent and adsorbate

B. Involves the chemical interctions between the adsorbent and adsorbate

C. Is irreversible in nature

D. Increases with increase with increase in temperature

Answer: A

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4. Adsorption is the phenomenon in which a substance :

A. Accumulates on the surface of the other substance

B. Goes close to the other substance

C. Remains close to the other substance

D. None of these

Answer: A

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5. According to Langmuir adsorption isotherm, the amount of gas adosobed at very high pressure

A. Directly proportional to the pressure

B. Proportional to $P^{1/n}$ (where $n > 1$)

C. Inversely proportional to the pressure

D. Idenpendent to the pressure of the gas.

Answer: A

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6. What is an adsorption isotherm? Freundlich adsorption isotherm.

A. Plot at constant pressure between x/m and temperature

B. Plot at constant volume between x/m and pressure

C. Plot at constant x/m between pressure and temperature

D. A special type of adsorption isotherm

Answer: C

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Evaluate Yourself 2

1. In Langumir's model of adosrption of a gas on a solid surface :

A. The mass of gas striking a given are of surface is proportional 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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2. Which one of the following statement is wrong

A. Physical adsorption of a gas is directly related to its critical temperature.

B. Chemical adsorption decreases regularly as the temperatgure is increaed

C. Adsorption is an exothermic process

D. A solid with a rough surface is a better adsorbent than the same solid with a smooth surface.

Answer: B

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3. Which one of the following is wrong about Chara

A. It involves only van der Waals forces of attraction .

B. It has low heat of adsorption

C. It is reversible in nature

D. It forms a unimolecular layer on the surface of the adsorbent .

Answer: D

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Evaluate Yourself 3

1. Which of the following statements is incorrect ?

A. Catalysts only accelerate the rate of a chemical reaction

B. Catalysts cannot start a chemical reaction

C. Catalysts can retard the rate of a chemical reaction

D. Catalysts can accelerate and retard the rate of a chemical reaction

Answer: A

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2. Which of the following statements is true ?

A. The addition of a catalyst changes equilibrium constant

B. A catalyst speeds up the forward reaction and slows down the reverse reaction

C. The composition of equilibrium mixture is not changed by the catalyst

D. Pressure change does not change the equilibrium concentration

Answer: C

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3. 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: D

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4. The inhibitors :

A. $(C_2H_5)_4$ pb

B. CO_2

C. Both (1) & (2)

D. None

Answer: A

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5. A catalytic poison renders the catalyst ineffective beacause :

A. Poison fon human body

B. enzyme for human body

C. vitamins for human body

D. None

Answer: C

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6. Assertion: A catalyst is more effective in finely divided form.

Reason: Finely divided form has more surface area.

A. finely powdered state

B. colloidal state

C. rough surface

D. all of these

Answer: A

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7. Zeolites are :

A. water softener

B. catalyst

C. Both (1) & (2)

D. None

Answer: C

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Evaluate Yourself 4

1. The coagulation power of an electrolyte for As_2S_3 decreases in the order:

A. Na^+, AI^{3+}, Ba^{2+}

B. $CI^-, SO_4^{2-}, PO_4^{3-}$

C. AI^{3+}, Ba^{2+}, Na^+

D. $PO_4^{3-}, SO_4^{2-}, CI^-$

Answer: C

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2. Which of the following sols is hydrophobic ?

A. Starch solution

B. Gum solution

C. Protein solution

D. Arsenic sulphide solution

Answer: D

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3. The property of colloidal suspension used to determine the nature of charge on the particles is :

A. Dialysis

B. Electrophoresis

C. Sedimentation

D. Ultrafiltration

Answer: B

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4. Gelatian is mostly used in making ice cream in order to

A. Prevent making of a colloid

B. Stabilise the colloid and prevent crystallisation

C. Stabilise the misture

D. Enrich the aroma

Answer: B

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5. A colloidal solution of $Fe(OH)_3$ in water is :-

A. $(+)$vely charged

B. $(-)$ vely charged

C. No charge

D. All of above

Answer: A

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6. Which of the following will form negatively charged colloided solution ?

A. 100 ml 0.1 M Ag NO_3 + 100 ml 0.1 MKI

B. 100 ml 0.2 M Ag NO_3 + 100 ml 0.1 MKI

C. 100 ml 0.1 M ag NO_3 +100 ml 0.2 MKI

D. 100 ml 0.1 M AgNO_3 + 200 ml 0.1 MKI

Answer: C

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Evaluate Yourself

1. Tyndall effect in colloidal solution is due to

A. Reflection of light

B. Refraction of light

C. Scattering of light by dispersed phae

D. Scattering of light by dispersion medium

Answer: C

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2. Aluminium hydroxide forms a positively charged sol.

Which of the following ionic substances should be most effective in coagulating the sol?

A. $AI(OH)_3$ Sol

B. Gold sol

C. CdS sol

D. Gum

Answer: A

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3. The gold number of Gelatin Gum and Starch are 0.005 , 0.15 and 25 respectively . Which colloid has highest protection power ?

A. Gelatin

B. Starch

C. Gum

D. All have equal protection power

Answer: A

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4. What will be nature of charge on colloidal particle when $FeCI_3$ is added to excess of hot water ?

A. Positive

B. Negative

C. Neutral

D. Some times positive and some times negative

Answer: B

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5. Tyndall effect is shown by :

A. True solution

B. Lyophilic colloid

C. Lyophobic colloid

D. Suspensions

Answer: D

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Cuq Adsorption

1. Surface layer of solid means

A. atoms peresent in the upper layer 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 surface of solid not precocupied by other substances .

Answer: B

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2. Which of the following is true during adsorption?

a. ΔG , ΔH , and ΔS all are negative.

b. ΔG is negative, but ΔH and ΔS is positive.

c. ΔG and ΔH are negative, but ΔS is positive.

d. ΔG and ΔS are negative, but ΔH is positive.

A. $-, +, -$

B. $-, -, +$

C. $-, -, -$

D. $-, +, +$

Answer: C

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3. Adsorption is accompanied by :

A. Decreases in entropy of the system

B. Decrease in enthalpy of the system

C. ΔH for the process is negative

D. All

Answer: D

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4. Which charateristic of adsorption is wrong :-

A. Physical adsorption in general decreases with temp

B. Physical adsorption in general increases with temp

C. Physical adsorption is a reversible process

D. Adsorption is limited to the surface only

Answer: B

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5. Which of the following is correct about the adsorption of N_2 over iron ?

A. It is always physically adsorbed

B. Extent of adsorption over iron in increases with the increase in temperture first and then decreases

C. It always chemically adsorbed

D. N_2 is near absorbed over iron

Answer: B

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6. Which one of the following is not a correct statement ?

A. Physical adsorption is revesible in nature

B. Physical adsorption involves vander waals forces

C. Rate of physical adsorption increases with increase of pressuere on the adsorbate

D. High activation energy is involved during physisorption

Answer: D

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7. Chemical adsorption

A. decreases with increase of temperature

B. increase with increase of temperature

C. first increases and then decreases with increase of temperature

D. first decreases and then increases with increases of temperature

Answer: C

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8. Sorption is the term used when :

A. Adsortion takes place

B. Absorption takes place

C. Both take place

D. Desorption takes place

Answer: C

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9. What is the role of desorption in the process of catalysis?

A. The surface is not available for the reaction to occur .

B. Making the surface available again for more reaction to occur .

C. Half of the surface is avilable for the reaction to occur.

D. all of these

Answer: B

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10. Which of the following cannot act as an adsorbent ?

A. Siclia gel

B. Clay

C. Oxygen gas

D. Activated charcoal

Answer: C

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11. Which one of the following is a property of physisorption ?

A. Non -specific nature

B. High specificity

C. Irreversibility

D. Single layer absorption

Answer: A

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12. Freundlich adsorption isotherm gives a straight line on plotting :

A. x/m versus P

B. log x/m versus P

C. log x/m versus log P

D. x/m versus 1/P

Answer: C

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13. Which can absorb large volume of hydrogen gas ?

A. Colloidal solution of palladium

B. Finely divided nickel

C. Finely diveded platinum

D. Colloidal $Fe(OH)_3$

Answer: A

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14. The process of froth floatation and chromatography are based on

A. Emulsification

B. Adsorption

C. Absorption

D. Both 2 and 3

Answer: B

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15. The intercept of Y -axis in the graph of $\log\frac{x}{m}$ versus log P gives

A. $\frac{1}{n}(n > 1)$

B. K

C. loh k

D. Temperature

Answer: C

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16. Pd can adsorb 900 times its volume of hydrogen. This is called :-

A. Absorption

B. Adsorption

C. Occlusion

D. 2and 3 both

Answer: C

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17. Which statement is correct

A. Physical adsorption is multi -layered nondirectional and non-specific

B. Chemical adsorption is unilayered

C. Chemical adsorption is more stronger than physical adsorption .

D. All the above

Answer: D

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18. Which of the following gases adsorb more

A. H_2

B. N_2

C. O_2

D. NH_3

Answer: D

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19. Which of the following is correct for the decrease in the physical adsorption with increase of temperature

A. Adsorption process is exothermic and according to Lechatelier principle the physical adsorption decreases with increase in temperature .

B. Physical adsorption is endothermic

C. Physical adsorption occurs at high temperature

D. all of these

Answer: A

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20. The term sorption for the simultaneous adsorption and absorption is coined by

A. Berzelius

B. Mc' Bain

C. Freundlich

D. Langmuir

Answer: B

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21. Charcoal is activated

A. by cooling it from 143° K to 127° C in vacuum

B. by cooling it to 23 K in vacuum

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

D. by heating upto 300 K

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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Cuq Catalyst

1. Which of the following types of metal form the most efficient catalysts?

A. Transition metals

B. Alkali metals

C. Alkaline earth metals

D. Radioactive

Answer: A

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2. Efficiency of the catalysts depends on its :

A. Molecular weight

B. Number of free valencies

C. Number of free valencies

D. Physical state

Answer: B

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3. Which one of the following is not the example of homogeneous catalysis :-

A. Formation of SO_3 in the lead chamber process

B. Formation of SO_3 in the contact process

C. Hydrolysis fo an ester in presence of acid

D. All

Answer: B

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4. The decomposition of hydrogen peroxide can be slowed by the addition of a small amount of acetamide. The latter acts as a

A. Inhibitor

B. Promoter

C. Moderator

D. Posion

Answer: A

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5. Which of the following statements is more correct ?

A. Catalyst only accelerates the rate of a chemical reaction

B. A catalyst can retard the rate of a chemical reaction

C. A catalyst can control the speed of a reaction

D. A catalyst alters the speed of a reaction

Answer: D

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6. In the reaction $KMnO_4 + H_2SO_4 + H_2C_2O_4 \rightarrow$ products, Mn^{2+} ions act as:

A. Positive catalyst

B. Negative catalyst

C. Auto catalyst

D. Enzyme catalyst

Answer: C

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7. In the Haber process of synthesis of NH_3 :

A. Mo acts as a catalyst and Fe as a promoter

B. Fe acts as a catalyst and Mo as a promoter

C. Fe acts as inhibotor and Mo as a catalyst

D. Fe acts as promoter and Mo as auto -catalyst

Answer: B

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8. TEL minimizes the Knocking effect when mixed with petrol. It acts as :-

A. Positive catalyst

B. Negative catalyst

C. Auto catalyst

D. Iduced catalysed

Answer: B

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9. Platinised asbestos is used as a catalyst in the manufacture of H_2SO_4.It is an example of :

A. Homogeneous catalyst

B. Heterogeneous catalyst

C. Auto -catalyst

D. Induced catalyst

Answer: B

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10. In Leat -Chamber process the catalyst is

A. NO only

B. NO_2 only

C. Mixture of NO & NO_2

D. N_2O_5

Answer: C

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11. In Haber 's process of Ammonia synthesis the substance that acts as catalytic poison

A. Fe_2O_3

B. As_2O_3

C. CO_1

D. H_2 S

Answer: D

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12. Which one of the following reaction is an example of heterogeneous catalysis?

A. $2CO_{(g)} + O_{2(G)} \xrightarrow{NO_{(g)}} 2CO_2$

B. $2SO_{2(g)} + O_{2(g)} \xrightarrow{NO_{(g)}} 2SO_3$

C. $2CO_{2(g)} + O_{2(g)} \xrightarrow{Pt_{(s)}} 2CO_2$

D. $CH_3CHO_g \xrightarrow{I_2(g)} CH_4 + CO_4CO$

Answer: C

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13. What are optimum temperature and pH for the enzymes to act best ?

A. $4 - 5$

B. $5-7$

C. $7-9$

D. <4

Answer: B

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14. Which of the following reactions is an example of auto catalysis ?

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

B. $N_{2(g)} + 3H_{2(g)} \xrightarrow{Fe(s)} 2NH_{3(g)}$

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

D.

$$C_{12}H_{22}O_{11} + H_2O_{(1)} \xrightarrow{H^+(1)} C_6H_{12}O_{6(i)} + C_6H_{12}O_{6(i)}$$

Answer: A

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15. When $KMnO_4$ solution is added to hot oxalic acid solution, the decolourisation is slow in the beginning but becomes instantaneous after some time. 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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16. The catalyst used to increase the dissociaiton of H_2O_2 is

A. Acetanilide

B. Glycerol

C. H_3PO_4

D. Caustic soda

Answer: D

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1. Size of colloidal particle is

A. 1 nm to 100 nm

B. 1 nm to 1000 nm

C. 10 nm to 1000 nm

D. 100 nm to 1000 nm

Answer: B

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2. Which is not a colloidal solution ?

A. Somke

B. Ink

C. Air

D. Blood

Answer: C

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3. Lyophobic colloids are :-

A. Reversible colloids

B. Irreversible colloids

C. Protective colloids

D. Gum , proteins

Answer: B

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4. Which of the following processess best describes the purification of muddy water by addition of alum?

A. Absorption

B. Coagulation

C. Dialysis

D. Electrodialysis

Answer: B

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5. Colloidal solution commonly used in treatment of eye disseae is :

A. Colloidal sulphur

B. Colloidal silver

C. Colloidal gold

D. Colloidal antimony

Answer: D

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6. Micelles formation takes place

A. At CMC and at kraft temperature

B. At CMC and at above kraft temperature

C. At above CMC and at kraft temperature

D. Above CMC and above kraft temperature

Answer: D

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7. Which of the following is positively charged colloidal particle ?

A. As_2S_3

B. $Al_2O_3.xH_2O$

C. Au

D. Pt

Answer: B

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8. Colloids can be purificed by

A. Tyndal effect

B. Coagulation

C. Peptization

D. Ultrafiltration

Answer: D

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9. Which of the following has minimum protecting power ?

A. Gelatin (Gold no . = 0.01)

B. Dextrin (Gold no = 15)

C. Potato starch (Gold no . = 25)

D. Albumin (Gold no . = 0.25)

Answer: C

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10. Movement of colloidal particles under the influence of electrostatic field is

A. Electrophoresis

B. Dialysis

C. Ionisation

D. Electrodialysis

Answer: B

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11. An emulsifier is an agenet which

A. Accelerates the dispersion

B. Stabilise the emulsion

C. Homogenizes the emulsion

D. Dissociate emulsions

Answer: B

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

A. to prevet the formation of a colloid

B. To stabilize the colloid and prevent crystal growth

C. To cause the mixtur to solidify

D. To improve the flavour

Answer: B

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13. Milk can be preserved by adding a few drops of

A. Formic acid solution

B. Formaldehyde solution

C. Acetic acid solution

D. Acetaldehyde solution

Answer: B

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14. When a river enter the sea a delta is formed formation of delta is due to

A. Peptization

B. Coagulation

C. Emulsification

D. Dialysis

Answer: B

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15. Which statement is incorrect ?

A. Higher the gold number of lyophilic sol better is its protective action

B. Lower the gold number of lyophilic sol better is its protective action

C. The Bredig's are method is usually suitable for preparing sols of inert metals

D. The osmotic pressure method gives the average molar mass of polymer

Answer: A

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16. The potential differnce between the fixed particles layer and the diffused layer having opposite charge id called :

A. Zeta potential

B. Streaming potential

C. Dorn potential

D. Colloidal potential

Answer: A

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17. The number of phase present in colloidal solution is :-

A. 2

B. 4

C. 3

D. 1

Answer: A

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18. Butter is a colloid formed when :

A. Fat is dispersed in fat

B. Fat is dispersed in water

C. Water is dispersed in fat

D. Suspension of caseing in water

Answer: C

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19. Lyophobic colloids are :-

A. Reversible

B. Irreversible

C. Water loving

D. Solvent loving

Answer: B

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

A. Dialysis

B. Peptization

C. Ultrafiltration

D. Electrodispersion

Answer: B

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21. $As_2O_3 + 3H_2S \rightarrow As_2S_3(Sol) + 3H_3O$, the principle involved in the preparation of above colloidal solution

A. Oxidation

B. Reduction

C. Double displacement

D. Hydrolysis

Answer: C

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22. A substance which forms micelles the solution contains

A. carboxylic group

B. alkyl groups

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

D. water soluble hydrocarbon group and water insoluble polar group

Answer: C

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23. The coagulation of colloidal particles of the sol can be caused by

A. Heating

B. Adding oppositely charged sol

C. Adding electrolyte

D. All the above methods

Answer: D

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24. Role of Desorption in the process of catalysis

A. The surface is not available for the reaction to occur .

B. Making the surface available again for more reaction to occur .

C. Half of the surface is avilable for the reaction to occur.

D. all of these

Answer: B

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25. If the dispersed phase is a liquid and the dispersion medium is a solid , the collide is known as a/an

A. aero sol

B. a gel

C. an emulsion

D. a foam

Answer: A

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26. If a solid is dispersed in a liquid the colloid is called

A. lyosol

B. Emulsion

C. Gel

D. Aerosol

Answer: A

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27. Which of the following sols is hydrophobic ?

A. Sulphur

B. Gum

C. Starch

D. Gelatin

Answer: A

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28. Which of the following are multimolecular colloids ?

A. Gelatin

B. Gold

C. Starch

D. Rubber

Answer: B

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29. Which of the following is not a negative colloid

A. Acid dye

B. basic dye

C. Platinum

D. All

Answer: B

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30. The dispersed 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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31. During the cleaning action of soap -part of soap dissolves in the dirt and encapsulates to form micelle

A. both hydrophyllic and hydrophobic

B. hydrophobic

C. hydrophilic

D. Cation

Answer: B

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32. The simplest way to check whether a system is colloidal is by

A. Tyndall effect

B. Brownian movement

C. Electrodialysis

D. Electrodialysis

Answer: A

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

A. Starch

B. AgCI sol

C. Arsenic sulphide sol

D. Sb_2S_3sol

Answer: A

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Exercise 1 C W

1. Spontaneous adsorption of a gas on solid surface is an exothermic process because

A. H in creases

B. S increases

C. G increases

D. S decreases

Answer: D

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2. The colouring matter removed by animal charcoal during purification of sugar ascts as

A. Adsorbate

B. Adsorbent

C. Adsorber

D. Catalyst

Answer: A

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3. Adsorption is always

A. Endothermic

B. Exothermic

C. Accompanies increase enthropy

D. Accompanies with increase of enthalpy

Answer: B

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4. During adsorption

A. $T\Delta S$ is positive

B. $\Delta H - T\Delta S$ is negative

C. ΔH is positive

D. $T\Delta S$ and ΔG becomes zero

Answer: B

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5. Adsorption is the tendency of accumulation of molecular species at the surface of solid or liquid. Depending upon the

nature of bonds or forces of attraction between adsorbate and adsorbent. It is classified between physisorption and chemisorption.

Which of the following gas molecules have maximum value enthalpy of physisorption?

A. C_2H_6

B. Ne

C. H_2

D. H_2

Answer: C

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6. Valence forces cause

A. Chemisorption

B. physical adsorption

C. sorption

D. adsorption involving multi layer

Answer: A

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7. The forces operating between the adsorbate and the adsorbent in physical adsorption are

A. vander Waals forces

B. Chemical forces

C. Covalent forces

D. All the three

Answer: A

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8. Which of the following is not a characteristic of chemisorption ?

A. Adsorption is irreversible

B. ΔH is of order of 80 -240 K.J

C. Adsorption is specific

D. Multilayered

Answer: D

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9. Extent of adsorption of adsorbate from solution phase increases with ..... .

A. increasing the temperature

B. increasing the surface area of the adsorbent

C. decreasing the surface area of the adsorbent

D. decreasing the concentration of the solute

Answer: B

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10. What will be the Freundlich's adsorption isotherm equation at high pressure?

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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11. Which of the following are used as good adsorbents in removing moisture and humidity

A. Silica gel

B. Aluminium gel

C. Charcoal

D. Both 2 and 3

Answer: A

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12. Heat evolved during chemisorption lies in the range of

A. $4 - 20$ kJ /mole

B. 80-240 KJ /mole

C. 20-40 KJ/mole

D. 500-1000 KJ/mole

Answer: B

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Exercise 1 C W Catalysis

1. In which of the following processes, platinum is used as a catalyst

A. Oxidation of ammonia to form nitric acid

B. Hardening of oil

C. Production of synthetic rubber

D. Synthesis of methanol .

Answer: A

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2. The temperature at which the catalystic activity of the catalysts is maximum ,is called

A. Critical temperature

B. Room temperature

C. Optimum temperature

D. Absolute temperature

Answer: C

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3. The decomposition of $KCIO_3$ is catalysed by

A. HCl

B. MnO_2

C. C_2H_5OH

D. Cl

Answer: B

Watch Video Solution

4. Which of the following catalysts is sensitive to temperature changes ?

A. Fe

B. Pt

C. Ni

D. Enzyme

Answer: D

Watch Video Solution

5. Which of the following exhibits specific activity in a catalytic reaction ?

A. Catalyst

B. Promoter

C. Catalyst poison

D. All the three

Answer: D

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Exercise 1 C W Colloids

1. In both dialysis and osmosis which particle do not pass through SPM :

A. water

B. Small molecules

C. colloids

D. all

Answer: C

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2. Greater is the protective power of lyophilic colloid

A. Lesser is its gold no

B. Greater is its gold no

C. Either of the above

D. None

Answer: A

Watch Video Solution

3. Which is the correct statement in case of milk?

A. Milk is an emulsion of fat in water

B. Milk in an emulsion of protein in water

C. Milk is stabilized by protein

D. Milk is unstabilized by fat

Answer: A

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4. Which of the following is an emulsifier ?

A. Soap

B. Water

C. Oil

D. NaCI

Answer: A

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5. The separation of colloidal particles from those of molecular dimension is known as :

A. Photolysis

B. Dialysis

C. Pyrolysis

D. Peptisation

Answer: B

Watch Video Solution

6. The Brownian motion is due to :

A. Temperature fluctuation within the liquid phase

B. Attraction and repulsion between charges on the colloidal particles

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

D. Convective currents

Answer: C

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7. Colloids can be purified by :

A. Peptization

B. Coagulation

C. Dialysis

D. Bredic Arc method

Answer: C

Watch Video Solution

8. Methylene bule sol

A. Negatively charged sol

B. Neutral

C. Positively charged sol

D. Both (1) & (3)

Answer: C

Watch Video Solution

9. Which of the following is not a colloid

A. H_2SO_4 solution

B. Solution of urea

C. Chlorophyll

D. All

Answer: D

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10. Sulphur sol is

A. Macromolecular colloid

B. Multi molecular colloid

C. Associated colloid

D. Micelle

Answer: B

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11. Preparation of gold sol by below method is bassed on

$2AuCI_3 + 3HCHO + 3H_2O \rightarrow 2Au(sol) + 3HCOOH + 6HCI$

A. Hydrolysis

B. Double decomposition

C. Reduction

D. Oxidation

Answer: C

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12. Bredig's arc method cannot be used for the preparation of colloidal sol of :

A. Copper

B. Gold

C. Silver

D. Sodium

Answer: D

 Watch Video Solution

13. In the preparation of ultra filter paper collodion solution is used collodion is

A. 4% solution nitro cellulose in a mixture of alcohol and ether

B. 4% solution cellulose acetate in phenol

C. 8% solution cellulose acetate in alcohol

D. formaldehyde in water

Answer: A

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14. Gold number is associated with

A. Protective power of lyophillic colloids

B. Protective power of lyophobic colloid

C. Peptisation power of a colloid

D. Precipitation power of a colloid

Answer: A

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15. Incorrect statement about lyophobic colloids

A. They are readily precipitated by adding small amount of electrolyte

B. They can be prepared by special methods

C. They are irreversible

D. They do not required stabilizing agents for their preservation

Answer: D

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16. Example for emulsion is

A. Vanishing cream

B. Curd

C. Ruby glass

D. Foam

Answer: A

Watch Video Solution

17. Which of the following is the emulsifying agent for both O/W type and W/O type of emulsions

A. Soaps

B. Graphite powder

C. Proteins

D. Both 1 & 2

Answer: D

View Text Solution

Exercise 1 H W Adsorption

1. According to the adsorption theory of catalysis the speed of the reaction increases because

A. In the process of adsorption the activation energy of the molecules becomes large

B. Adsorption produces heat which increases the speed of the reaction

C. Adsorption lowers the activation energy of the reaction

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

Answer: D

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2. Which statement is not correct ?

A. Physical adsorption is due to van der Waals forces

B. Physical adsorption dereases at high temperature and low pressure

C. Physical adsorption is reversible

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

Answer: D

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3. Adsorption explains all the following except

A. origin of charge on colloids

B. decolourization of sugar solution on charcoal

C. efficiency of finely divided metals as catalyst

D. action of enzymes

Answer: D

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4. Which is used to remove colour from raw cane sugar juice

A. Alumina

B. Silica gel

C. Animal charcoal

D. Nickel powder

Answer: C

Watch Video Solution

5. Gas masks containing activated chrcoal to remove poisonous gases from atmosphere act on principle of

A. occulsion

B. desorption

C. Absorption

D. adsorption

Answer: D

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6. Chromatographic analysis finds a number of applications in analytical and Industrial fields based on the principle of

A. Chemical adsorption

B. Physical adsorption

C. Hydrogen bonding

D. Sedimentation

Answer: B

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

A. Adsorption on solids is reversible

B. A dsorption increases with increase in temerature

C. Adsorption is spontaneous

D. Both enthalpy and enthropy of adsorption are negative

Answer: B

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8. The higher the critical temperature of the gas

A. greater is its adsorption

B. lower its adsorption

C. lesser is the case of liquification

D. lesser is its volatile nature

Answer: A

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9. 50ml of 1M oxalic acid is shaken with $0.5g$ of wood charcoal. The final concentration of the solution after adsorption is 0.5M. Amount of oxalic acid absorbed per gm of charcoal is

A. 3.15 g

B. 3.45 g

C. 6.3 gm

D. 5.20 g

Answer: C

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10. Cheese is a colloidal system of -

A. gas in liquid

B. liquid in solid

C. gas in solid

D. solid in gas

Answer: B

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1. Which statement is wrong

A. Haber 's process of NH_3 requires iron a catalyst

B. Friedel creaft 's reaction requires anhydrous $AICI_3$

C. Hydogenation of oils requires iron as catalyst

D. Oxidation of SO_2 to SO_3 requires V_2O_5

Answer: C

View Text Solution

2. Which is false for catalyst ?

A. A catalyst can initiate reaction

B. It does not alter the position of equilibrium in a reversible reaction

C. A catalyst remains unchanged in quality and composition at the end of reaction

D. Catalysts are sometimes veryspeccific in respect of a reaction

Answer: A

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3. Air can oxidize sodium sulphite in eq. solution but cannot do so in the case of sodium arsenite. If however, air is passed through a solution containing both sodium sulphite & sodium arsenite then both are oxidized. This is an example of :-

A. Positive catalysis

B. Negative catalysis

C. Induced catalysis

D. Auto catalysis

Answer: C

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4. Zeolites are :-

A. Water softner

B. Catalyst

C. Cation exchanger

D. All of these

Answer: D

Watch Video Solution

5. Zeolites :

A. Are microporous aluminosilicates

B. Have general formula

$$Mx/n\left[(AlO_2)_x(SiO_2)_y\right]mH_2O$$

C. have pore sizes between 260 pm to 740 pm

D. All

Answer: D

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6. Zeolites are used as catalyst in :

A. Petrochemical industries during cracking

B. In the preparation of H_2SO_4

C. In they drolysis of ester

D. All

Answer: A

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7. Which of the following statement regarding catalyst is not true?

A. A catalyst remains unchanged in composition and quantity at the end of the reaction .

B. A catalyst cannot initiate a reaction

C. A catalyst does not take part in a reaction

D. A catalyst does not alter the equilibrium in a reversible reaction .

Answer: C

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8. Which one of the following is an example of homogeneous catalysis ?

A. Oxidation of SO_2 to SO_3 in the lead chamber process

B. Oxidation of SO_2 to SO_3 in the contact process

C. Manufacture of NH_3 by Haber 's process

D. Oxidation on NH_3 to NO in Ostwald ' s process

Answer: A

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9. i. The ability of a catalyst to direct the reaciton to yield particular products is called

a. Reactivity b. Selectivity c. Activity d. Fugacity

ii. Which of the following Is an example of zeolite?

a. $ZSM-5$ b. $AgNO_3$ c. $Mg(OH)_2$ d. $Co(OH)_3$

(iii) Reactions in zeolite catalyst depends on

a. Pores b. Apertures

c. Size of cavities d. All of these

A. reactivity

B. selectivity

C. activity

D. fugacity

Answer: B

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10. The effieciency 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 these

Answer: A

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11. At what P^H and temp the enzymes are highly effcient.

A. P^H =5-7, 298 -310 K

B. P^H = 7-9 , 298 -310 K

C. P^H = 7.2,278-295 K

D. P^H =0 , 273 -283 K

Answer: A

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12. Zeolites are good shape -selective catalysts because of

A. F.C.C. structure

B. Honey -comb like structure

C. Butterfly structur

D. B.C.C structure

Answer: B

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13. Incorrect statement about zeolites is

A. Zeolites are shape selective catalysts

B. They have honeycomb like structure

C. The are 3 -D micro porous silicates containing Al-O-Si frame work

D. ZSM -5 ius used as catalyst for cracking and isomerisation of hydrocarbons

Answer: D

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Exercise 1 H W Colloids

1. Opal (mineral with liquid inclusions) is a :

A. Gel (liquid dispersed in solid phase)

B. Solid sol (solid dispersed in solid phase)

C. Sol (solid dispersed in liquid)

D. Foam (gas dispersed in liquid)

Answer: A

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2. Some of the following are true solutions :

I : Air	II : Sea water
III : Glucose solution	IV : Gem store
V : Pearl	VI : Blood

Select true solutions :

A. I,II, III

B. II, III, IV, V

C. I, IV, V, VI

D. II, IV, VI

Answer: A

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3. Tyndall effect is not observed in

A. Suspension

B. Starch sol

C. Gold sol

D. NaCI solution

Answer: D

Watch Video Solution

4. Which is kinetic phenomenon ?

A. Brownian motion

B. tyndall effect

C. Both 1 and 2

D. None

Answer: A

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5. Gold number gives

A. The amount of gold present in the colloid

B. The amount of gold required to break the colloid

C. The amount of gold required to protect the colloid

D. None of the above

Answer: D

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6. The size of particles in suspension , true sloution and solution and colloidal solution varies in the order :

A. Suspension $>$ Colloidal $>$ True Solution

B. True Solution $>$ Suspension $>$ Colloidal

C. Suspension $>$ Colloidal = True Solution

D. None of the above

Answer: A

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7. The colloidal system consisting of a liquid adsorbent and a gas adsorbate is termed as

A. Aerosol

B. Liquid aerosol

C. Foam

D. Gel

Answer: C

Watch Video Solution

8. The lowering of activation energy by catalyst is due to :

A. Formation of adsorbed activated complex and to provide new parthway to reaction

B. Adsorption is always exothermic

C. The adsorbed activated complex possess lowest energy level than simple activated complex

D. All of the above .

Answer: C

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9. Lyophilic sols are more stable than lyophobic sols because :

A. The colloidal particles have positive charge

B. The colloidal particles have negative charge

C. The colloidal particle are solvated

D. There are strong electrostatic repulsions between the negatively charged colloidal particles

Answer: A

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10. When a colloidal sol is observed under a microscope we can see,

A. Light scattered colloidal particles

B. Size of the particle

C. Shape of the particle

D. Relative size

Answer: A

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11. On adding few drops of dilHcl or $FeCl_3$ to freshly precipitated ferric hydroxide , a red coloured clloidal solution is obtained . This phenomenon is known as :

A. Peptisation

B. Dialysis

C. Protective action

D. Dissolution

Answer: A

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12. which of the following will have the highest coagulating power for As_2S_3 colloid?

A. PO_4^{3-}

B. SO_4^{2-}

C. AI^{3+}

D. Na^{+}

Answer: D

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13. Electro - osmosis is observed when :

A. dispersion medium begins to move in an electric field

B. dispersed phase begains to move in an electric field

C. both (a) and (b)

D. No movement of particles

Answer: A

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14. Which of the following has largest protecting power -

A. Gelatin (Gold no . 0.01)

B. Dextrin (Gold no . = 15)

C. Potato starch (gold no .=55)

D. Albumin (Gold no . = 0.25)

Answer: A

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15. Which is not a gel ?

A. Cheese

B. Butter

C. Boot polish

D. Blood

Answer: D

Watch Video Solution

16. In brownian motion , the paths of the particles are :

A. Linear

B. Zig -Zag

C. Circular

D. Curved

Answer: B

Watch Video Solution

17. smoke precipitator work on the principal of :

A. Centrifugation

B. Neutralization of charge on colloids

C. Absorption

D. Peptisation

Answer: B

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1. Adsorption is accompanied by

A. Langmuir adsorption is highly specific

B. Vander waal's adsorption is reversible

C. Both 1 and 2 are exothermic

D. All are correct

Answer: D

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2. Which charateristic of adsorption is wrong :-

A. Physical adsorption is general decreases with temp .

B. Physical adsorption in general increases with temp

C. Physical adsorption is a reversible process

D. Adsorption is liite to the surface only

Answer: B

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3. In the lake tast for Al^{3+} ions, there is the formation of coloured 'floating lake'. It is due to :

A. Adsorption of litmus by Al $(OH)_4$

B. Adsorption of litmus $AI(OH)_3$

C. Adsorption of litmus by H_2O

D. Absorption of litmus by $AI(OH)_4$

Answer: B

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4. Chromatography is a technique based on

A. adsorption and then dispersion of solute

B. adsorbent 's ability for preferential absorption

C. hydration of solute

D. evaporation of solute

Answer: B

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5. The volume of gases H_2, CH_4, CO_2 and NH_3 adsorbed by 1 g of charcoal at 288K are in the order :

A. $H_2 > CH_4 > CO_2 > NH_3$

B. $CH_4 > CO_2 > NH_3 > H_2$

C. $CO_2 > NH_3 > H_2 > CH_4$

D. $NH_3 > CO_2 > CH_4 > H_2$

Answer: D

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6. Which of the following processes of metallurgy involves adsorption ?

A. Magnetic separation method

B. Electrostatic separation method

C. Gravity separation method

D. Froth floatation process

Answer: D

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7. According to langmuir adsorption isotherm amount of gas adsorbed at very low pressure

A. Directly proportional to the pressure

B. Proportional to $P^{1/n}$ (where $n > 1$)

C. Inversely proportional to the pressure

D. Independent to the pressure of the gas .

Answer: A

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8. Which of the following relations is /are correct?

(i) $x/m =$ constant (at high pressure)

(ii) $x/m =$ constant $\times P^{1/n}$ (at intermediate pressure)

(iii) $x/m =$ constant $\times P^{n}$ (at low pressure)

A. All are correct

B. all are wrong

C. I and II are correct

D. III is correct

Answer: A

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9. A catalyst :

A. increase the free energy change in the reaction

B. decreases the free energy change in the reaction

C. does not increase or decrease the free energy change in the reaction

D. can either decrease or increase the free energy change depending on what catalyst we use

Answer: C

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10. In a reversible reaction a catalyst :-

A. Increases the rate of forward reaction

B. Decreases the rate of forward reaction

C. Increases the rate of backward and forward reactions

D. Alters the equilibrium constant of the reaction

Answer: C

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11. Which of the following is not an example of homogeneous catalysis?

A. Hydrolysis of esters in presence of acid

B. Combination of H_2 and CI_2 in the presence of moisture

C. Formation of sulphur trioxide in the contact process

D. Formation of sulphur trioxide in the chamber process

Answer: A

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12. The decomposition of hydrogen peroxide can be slowed by the addition of a small amount of acetamide. The latter acts as a

A. Detainer

B. Stopper

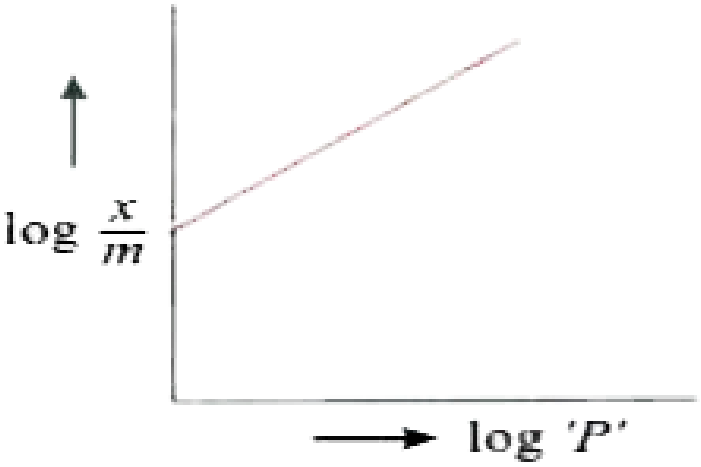
C. Promoter

D. Inhibiter

Answer: D

Watch Video Solution

13. 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

Watch Video Solution

14. In which of the following process, a catalyst is not used ?

A. Haber process

B. Deacon 's process

C. Solvay process

D. Lead chamber process

Answer: C

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15. Adsorption is a surface phenomenon and it differs feom adsorption which occurs throughout the body of the substance which absorbs. In physisorption, the attractive forces are mainly

van der Waals' forces while in chemisorption actual bonding occurs between the particles of adsorbent and adsorbente. Generally, easily liquefying gases are adsorbed more easily on the surface of a solid as compared to teh gases whihc are liquefied with difficult. Adsorption increases with the increases in pressure and decreases as the temperature is increases.

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

A. The concentration of reactant molecules at the active centre 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 the reaction
D. Adsorption lower the reaction temperature

Answer: A

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16. Organic catalysts differ from inorganic catalysts

A. By acting at high temperature

B. By acting at low temperature

C. Being used up

D. Being protenious in nature

Answer: B

View Text Solution

17. Which one of the following is not a homogeneous catalytic reaction ?

A. manufacture of H_2SO_4 by lead chamber process

B. acid catalysed hydrolysis of ester

C. inversion of cane suger in the presence of mineral acid

D. manufacture of H_2SO_4 by contact process

Answer: D

View Text Solution

18. Decomposition of urea into NH_3 and CO_2 is followed by the action of enzyme

A. urease

B. Pepsin

C. Invertase

D. All of the these

Answer: A

Watch Video Solution

19. Which of the following enzyme is used in the conversion of proteins to Amino acids

A. urease

B. Diastase

C. Maltase

D. Tripsin

Answer: D

Watch Video Solution

20. Zeolites are microporous catalyst. General formula of Zeolite may be given as :

A. $Mx/n\left[(AI_2O_3)_x(SiO_2)_4\right]mH_2O$

B. $Mx\left[(SiO_2)_4\right]mH_2O$

C. $M_x\left[(AI_2O_3)_x(SiO_2)_4\right]$

D. $M\left[(AI_2O_3)_x\right]mH_2O$

Answer: A

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21. $CH_3COCI + H_2 \xrightarrow{Pd} CH_3CH_2OH$

$\xrightarrow[\text{quinoline}]{Pd / BaSO_4} CH_3CHO$ here quinoline acts as

A. $+$ ve catalyst

B. Catalyst poison

C. Promoter

D. Medium

Answer: B

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22. An example of auto - catalytic reaction is

A. The decomposition of nitroglycerine

B. Thermal reaction between $KCIO_3$ and MnO_2

C. Break down of ^{14}C

D. Hydrogenation of vegetable oil using nickel catalyst

Answer: A

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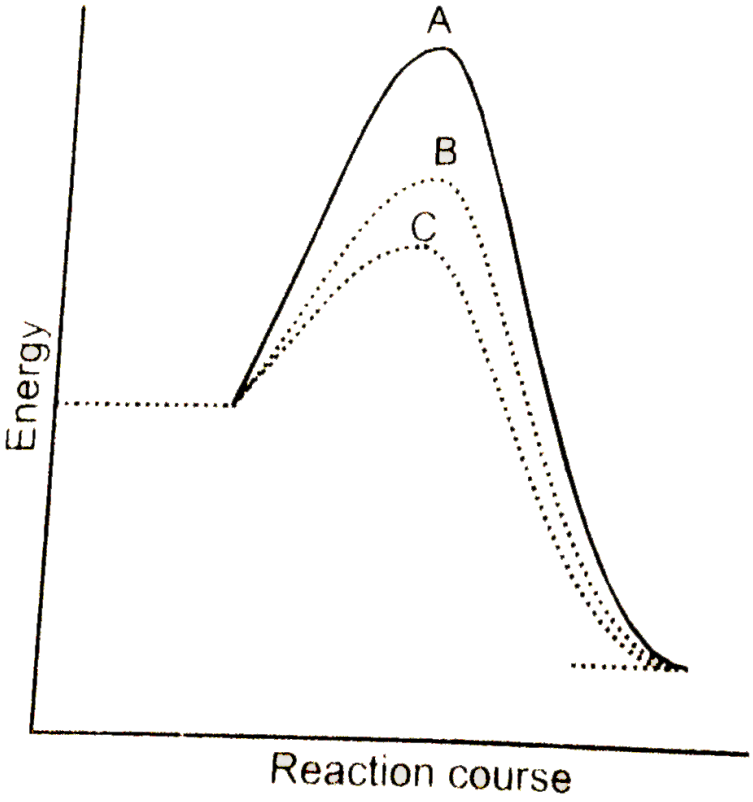
23. A homogenous catalytic reaction takes place through the three alternative plots A, B, and C shown in the given figure. Which one of the following indicates the relative ease with

which the reaction cant take place?



A. $A > B > C$

B. $C > B > A$

C. $B > C > A$

D. A = B =C

Answer: A

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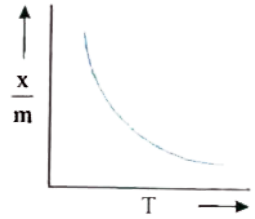
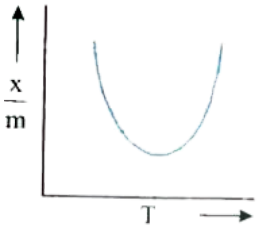
Exercise 2 C W Catalysis

1. Which plot is the adsorption isobar for chemisorption?

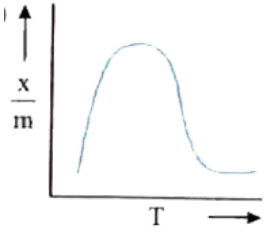
A.



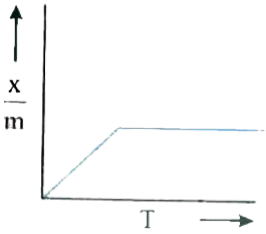
B.



C.



D.



Answer: C

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Exercise 2 C W Colloids

1. The flocculation of values of KCl, $MgCI_2$, $CrCI_3$ and $SnCI_4$ for a negatively charged sol are in the order .

A. $KCI < MgCI_2 < CrCI_3 < SnCI_4$

B. $KCI = MgCI_2 = CrCI_3 = SnCI_4$

C. $MgCI_2 < KCI < CrCI_3 < SnCI_4$

D. $SnCI_4 < CrCI_3 < MgCI_2 < KCI$

Answer: D

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2. The ability of ion to bring about coagulation of a given collidal solution depends upon

A. Its size

B. The magnitude of its charge only

C. The sign of its charge alone

D. Both magnitude and sign of its charge .

Answer: D

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3. Following are various types of colloids. Match column X with column Y.

X	(Colloids)	Y	(Classification)
I	Rain cloud	A	Sol
II	Gelatin	B	Aerosol
III	Soap suds	C	Gel
IV	Butter	D	Foam

Correct matching is :

A. $\begin{matrix} I & II & III & IV \\ A & B & C & D \end{matrix}$

B. $\begin{matrix} I & II & III & IV \\ A & C & B & D \end{matrix}$

C. $\begin{matrix} I & II & III & IV \\ B & A & D & C \end{matrix}$

D. $\begin{matrix} I & II & III & IV \\ B & A & C & D \end{matrix}$

Answer: C

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4. Out of the following, which reaction gives rise to a colloidal sol:

A. $Cu + HgCI_2 \rightarrow CuCI_2 + Hg$

B. $2HNO_3 + 3H_2S \rightarrow 3S + 4H_2O + 2NO$

C. $2Mg + CO_2 \rightarrow 2MgO + C$

D. $Cu + CuCI_2 \rightarrow Cu_2CI_2$

Answer: B

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5. Fog is a colloidal system of :-

A. Liquid dispersed in gas

B. Gas dispersed in gas

C. Solid dispersed in gas

D. Solid dispersed in liquid

Answer: A

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6. The stabilization of a dispersed phase in a lyopobic colloid is due to

A. The viscosity of the medium

B. The surface tension of the medium

C. Affinity for the medium

D. Affinity for the medium

Answer: D

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7. Milk is

A. Fat dispersed in milk

B. Fat dispersed in water

C. Water dispersed in fat

D. Water dispersed in oil

Answer: B

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8. Butter is a colloid formed when :

A. Fat is dispersed in water

B. Fat globules are dispersed in water

C. Water is dispersed in fat

D. None of the above

Answer: C

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9. A liquid aerosol is a colloidal system fo

A. A liquid dispersed in a solid

B. A liquid disperesed in a gas

C. A gas disperse in air

D. None of the above

Answer: B

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10. Which of the following is not a colloid?

A. Chlorophyll

B. Smoke

C. Ruby glass

D. Milk

Answer: A

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11. Which of the following is a homogeneous system ?

A. Muddy water

B. Bread

C. Concrete

D. A solution of suger in water

Answer: D

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12. When FeC_3 solution is added to NaOH a negatively charged sol is obtained. It is due to the:

A. Presence of basic group

B. Preferential adsorption of OH ions

C. Self dissociation

D. Electron capture by sol particles

Answer: B

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13. The colloidal solutions of gold prepared by different methods have different colors due to :

A. Variable valency of gold

B. Different concentration of gold particles

C. Impurities produced by different methods

D. different sizes of colloidal gold particles

Answer: D

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14. Which of the following are macromolecular colloids ?

A. Nylon

B. cellulose

C. Proteins

D. all of these

Answer: D

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15. Which one of the following is not a property oif Hydro sols ?

A. High concentration of dispersed phase can be easily attained .

B. Coagulation is reversible .

C. Viscosity and surface tension are about the same as for water .

D. The charge of particle depend upon the P^H values of the medium it may be positive negative or even zero.

Answer: C

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16. the minimum amount of an electrolyrte required to cause coagulation of a sol is called :

A. Flocculation value

B. protective value

C. Gold number

D. Critical value

Answer: A

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17. Solutions of soaps and detergents exhibit colloidal properties at

A. low concentrations

B. higher concentrations

C. very low concentrations

D. medium concentrations .

Answer: B

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18. When a beam of light is passed through collidal solution,

A. Gets scattered

B. Gets adsorbed

C. is refracted

D. Undergoes reflection

Answer: A

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19. Which of the following ielectrolytes is least effective in causing flocculation of ferric hydroxide sol?

A. $K_3[Fe(CN)_6]$

B. K_2CrO_4

C. KBr

D. K_2SO_4

Answer: C

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20. Which of the following is with highest and lowest flocculation value among

$AI^{+3}, Na^+, Mg^{+2}, Na^{+2}$?

A. AI^{+3}, Na^{+}

B. Na^{+}, AI^{+3}

C. Ba^{+2}, AI^{+3}

D. They have same flocculation value

Answer: B

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21. Isoelectric point refers to the $\left[H^{+}\right]$ at which the collodial particles .

A. Coagulate

B. becomes electrically neutral

C. can move to either electrode when subjected to an electric field

D. Reverse their electrical charge.

Answer: B

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22. Detergent action of synthesis detergents is due to their.

A. Inter facial area

B. High molecular weight

C. Ionisation

D. Emulsifying properties

Answer: D

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23. Match the following

Column -I	Column-II
(A)Occlusion	$(P)CaCI_2 + H_2O$
(B)Sorption	(q)Hydrated chabazite $+ H_2O$vapour
(C)Persorption	(r)Dil.KCI solution $+$ Blood charcoal
(E)absorption	$(t)H_2$on palladium surface

A. A-t , B-r, C-q, D-s, E-p

B. A-t, B-s, C-q, D-r, E-p

C. A-p, B-s, C-q, D-r, E-t

D. A-s , B-t , C-q, D-r , E-p

Answer: B

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24. Match the following

List-I	List-II
(A)physical adsorption	$(1)\frac{x}{m} = kp^{1/n}$
(B)chemisorption	(2)Bulk phenomenon
(C)Fruendlich adsorption isotherm	(3)multilayered
(D)absorption	(4)unilayered

A.

A	B	C	D
1	2	3	4

B.

A	B	C	D
3	4	1	2

C.

A	B	C	D
2	3	1	4

D.

A	B	C	D
3	4	2	1

Answer: B

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25. Match the following

List-I	List-II
(A) Ammonia preparation	(1) Bio catalysed
(B) Hydrogenation	(2) Fe
(C) Fermentation	(3) Ni
$(D)\ SO_2 + \frac{1}{2}O_2 \xrightarrow{NO} SO_3$	(4) Homogeneous

A.

A	B	C	D
4	3	1	2

B.

A	B	C	D
3	2	1	4

C.

A	B	C	D
1	2	4	3

D.

A	B	C	D
2	3	1	4

Answer: D

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26. Match the following

List-I	List-II
(A)blood	(1)liquid in liquid sol
(B)milk	(2)solid in liquid sol
(C)smoke	(3)Gas in Gas sol
(D)cloud	(4)liquid in air sol
	(5)solid in air sol

A.

A	B	C	D
1	3	2	5

B.

A	B	C	D
2	1	5	4

C.

A	B	C	D
5	3	2	4

D.

A	B	C	D
4	5	2	1

Answer: B

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27. Match the List -I with List -II and select the correct answer using the codes given below the lists .

List-I	List-II
(A) Coagulation	(1) Scattering
(B) Lyophilization	(2) Washing of precipitates
(C) Peptization	(3) Purificationof colloids
(D) Tyndall effect	(4) Electrolyte

A.

A	B	C	D
4	3	2	1

B.

A	B	C	D
2	1	3	4

C.

A	B	C	D
3	1	2	4

D.

A	B	C	D
4	3	1	2

Answer: A

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28. Match the List -I (Colloidal dispersion) with List -II (Nature of the dispersion) and Select the correct answer using the codes given below the lists .

List-I (Colloidal dispersion)	List-II Nature of dispersion
(A)Milk	(1). Solid in liquid
(B)Clouds	(2). Liquid in gas
(C). Paints	(3). Solid in solid
(D). Jellies	(4). Liquid in Liquid
	(5)Liquid in solid

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

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

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

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

Answer: A

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29. Column - I and Column - II contains four emtries each. Entries of Column -I are to be matched with some entries of Column - II . One or more than one entries of Column -I may have the matching with the same entries of Column - II.

column-I	column-II
$(A) As_2S_3$ sol	(P) Lyophobic colloid
(B) sulphur sol	(Q) Macromolecualr colloid
(C) starch	(R) Multimolecular colloid
(D) Soap	(S) Associated colloid

A. $A \to S, B \to Q, C \to R, D \to P$

B. $A \to Q, B \to S, C \to R, D \to P$

C. $A \to P, B \to R, C \to Q, D \to S$

D. $A \to R, B \to S, C \to Q, D \to P$

Answer: C

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Exercise 2 H W Adsorption

1. According to Freundlich adsorption isotherm, which of the following is correct ?

A. $\frac{x}{m}\alpha P^0$

B. $\frac{x}{m}\alpha P$

C. $\frac{x}{m}\alpha P^{1/n}$

D. All the above are correct for different ranges of pressure .

Answer: D

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2. Based on langmuir adsorption isotherm the interceot 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. $\frac{1}{\text{slope}}$

Answer: B

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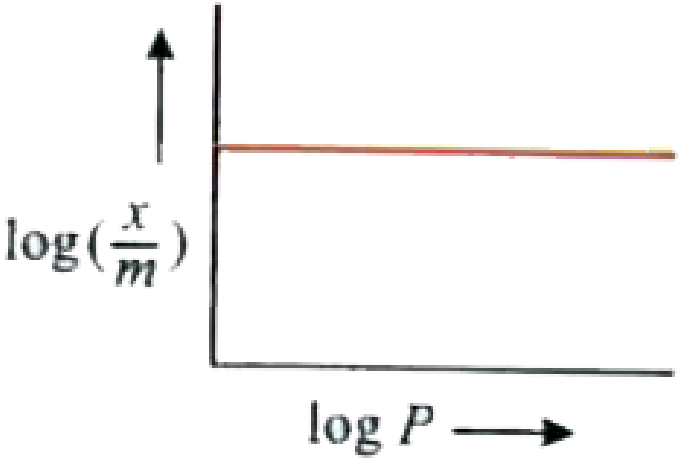
3. Following graph will be true when



A. P=0

B. P-1

C. $\frac{1}{n} = 0$

D. $\frac{1}{n} = \infty$

Answer: C

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4. The coagulation of $10cm^3$ of gold sol by $1ml10\ \%\ NaCl$ solution is completely prevented by addition of $0.025g$ of starch to it. The gold number of starch is

A. 0.25

B. 0.025

C. 25

D. 250

Answer: C

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5. The gold number of three substances A , B and C are 0.05 , 0.8 and 0.3 . The substance with maximum protective power is

A. A

B. B

C. C

D. All of these

Answer: A

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Exercise 2 H W Catalysis

1. A catalytic poison renders the catalyst ineffective beacause :

A. it is preferentially absorbed on the catalyst

B. it absorbs 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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2. Identify the correct statement regarding enzymes

A. enzymes are specific biological catalysts that can normally function at very high temperature (T= 1000 K)

B. Enzymes are normally heterogeneous catalysts that are very specific in action

C. Enzymes are specific biological catalysts that can not be poisoned

D. Enzymes are specific biological catalysts that possess well defined active sites .

Answer: B

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3. Which of the following act as negative catalyst ?

A. Lead tetraethyl as anti nock compound

B. Glycerol in the decomposition of H_2O_2

C. Ethanol in the oxidation of chloroform

D. All the above

Answer: D

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4. The inhibitors :

A. retard the rate of a chemical reaction

B. stop a chemical reaction immediately

C. are reducing agents

D. do not allow the reaction to proceed

Answer: A

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5. Which of the following statements about the zeolites is false?

A. They are used as cation exchanger

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

C. Zcolites are alumino silicates having three dimensional network

D. some of the SiO_4^{4-} units are replaced by $AIO_5^{4}{}_-$ and AIO_6^{5-} ions in zeolties

Answer: D

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Exercise 2 H W Colloid

1. The Brownian motion is due to :

A. Temperature fluctuation within the liquid phase

B. Attraction and repulsion between charges on the colloidal particles

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

D. Convective currents

Answer: C

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2. Blue colour of water in sea is due to

A. Refraction of the blue light by the impurities in sea water

B. Reflection of blue sky by sea water

C. Scattering of blue light by water molecule

D. Absorption of other colours except the blue colour by water molecules

Answer: C

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3. The emulsifying agent in milk is

A. Casein

B. Lactic acid

C. Lactorse

D. Citric acid

Answer: A

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4. the stability of lyophilic colloids is due to

A. Charge on their particle

B. A layer of kmedium of dispersion on their particles

C. The smaller size of their particles

D. The large size of their particles

Answer: B

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5. Sulphur sol contains :

A. Discrete sulphur atoms

B. Discrete sulphur molecules

C. Large aggreegates of sulphur molecules

D. Water dispersed in solid sulphur

Answer: B

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6. surface tension of lyophilic sols is

A. Lower than water

B. More than water

C. Equal to water

D. None of these

Answer: A

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7. Which of the following is not a colloid?

A. Milk

B. Blood

C. Ice - cream

D. Urea solution

Answer: D

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8. The colloidal solutions of gold prepared by different methods have different colors due to :

A. Variable valency of gold

B. Different concentration of gold particles

C. Different type of impurities

D. Different diameters of colloidal particles

Answer: D

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9. Which of the following has maximum value of flocculating power?

A. Pb^{2+}

B. Pb^{4+}

C. Sr^{2+}

D. Na^{+}

Answer: D

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10. Tyndall effect in colloidal solution is due to

A. Scattering of light

B. Reflection of light

C. Absorption of light

D. Presence of electrically charged particles

Answer: A

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11. Which of the following is crystalloid

A. Egg albumin

B. Starch

C. Glucose

D. Gum

Answer: C

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12. Which of the following constitute irreversible colloidal system in water as dispersion medium

A. Clay

B. Platinum

C. $Fe(OH)_3$

D. All of these

Answer: D

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13. Lyophobic colloids show

A. no interaction with the dispersion medium

B. Medium interctions with the dispersion medium

C. Strong interaction with the dispersion medium.

D. Less interaction with the dispersion medium.

Answer: A

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14. Lyophilic and lyophobic colloids are classified depending upon

A. the interaction of two phases.

B. The electrical charge of the dispersed phase

C. The appearance

D. the structure of particles

Answer: A

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15. Which is not a property of lyophilic sols .

A. It can be prepared directly by mixing dispersion phase and dispersion medium

B. It is reversible

C. Viscosity of disperged phase same as that of dispersion medium

D. It particles do not carry charge

Answer: D

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16. The solution of rubber in benzene is an example of

A. Multimolecular colloid

B. Macromolecular colloid

C. Associated colloid

D. Lyophobic colloid

Answer: B

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17. During micelle formation :

A. $\Delta H = +ve, \Delta S = +ve$

B. $\Delta H = -ve, \Delta S = -ve$

C. $\Delta H = -ve, \Delta S = +ve$

D. $\Delta H = +ve, \Delta S = -ve$

Answer: D

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18. The digestion of fats in the intestines is aided by

A. hydrolysis

B. oxidation

C. Reduction

D. emulsification

Answer: C

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19. Cold cream is an example of

A. oil in water emulsion

B. solid in a liquid sol

C. water in oil emulsion

D. liquid in a solid sol

Answer: C

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20. Which of the following is an example of oil in water emulsion?

A. soap

B. detergent

C. gelatine

D. egg yolk

Answer: C

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21. Curd is an example of

A. sol

B. foam

C. aerosol

D. gel

Answer: D

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

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

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

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

Answer: D

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23. The coagulation values of $AICI_3$ and NaCI are 0.093 and 52 respectively . Then coagulating power of $AICI_3$ as compared to that of NaCI is

A. 52×0.093 times

B. $52/0.093$ times

C. $0.093/52$ times

D. $52 - 0.093$ times

Answer: B

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24. 10^{-4}g of gelation is required to be added to 100 cm^3 of a standard gold solution to just prevent its precipitation by

addition of $1cm^3$ of 10% NaCI solution to it . Hence the gold number of gelation in mg is

A. 10

B. 1.0

C. 0.1

D. 0.01

Answer: D

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25. The number of moles of lead nitrate needed to coagulate 2 moles of colloidal [AgI] I^- is

A. 2

B. 1

C. $1/2$

D. $2/3$

Answer: B

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Exercise 3

1. The diameter of colloidal particles range from

A. 10^{-6} m to 10^{-9} m

B. 10^{-9}m to 10^{-12} m

C. 10^{3} m to 10^{-3} m

D. 10^{-3} m to 10^{-6} m

Answer: A

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2. Non - electrolyte colloidal surfactants is

A. $C_{12}H_{35}COONa$

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

C. $C_nH_{2n+1}(OCH_2CH_2)_xOH$

D. All

Answer: C

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3. 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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4. The Langmuir adsorption isotherm is deduced using the assumption

A. The adsorption takes place in multilayers

B. The adsorption sites are equivalent in their ability to adsorb the particles

C. The heat of adsorption varies with coverage

D. The adsorbed molecules interact with each other

Answer: B

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5. According to the adsorption theory of catalysis the speed of the reaction increases because

A. Adsorption produces heat which increses the speed of the reaction

B. Addsorption lowers the activation energy of the reaction

C. The concentration of rectant 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 become large

Answer: B

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6. At the high pressure Langmuir adsorption isotherm takes the form

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

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

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

D. $\frac{m}{x} = \frac{b}{a} + \frac{1}{ap}$

Answer: B

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7. Assertion (A): The conversion of fresh precipiate to colloidal state is called peptization Reason (R) : It is caused by addition of commonions

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

B. Both (A) and (R) true but (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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8. The equation for Freundlich adsorption isotherm is

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

B. $x = mkP^{1/n}$

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

D. All of these

Answer: B

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9. An example of intrinsic colloid is :

A. Glue

B. Sulphur

C. Fe

D. As_2S_3

Answer: A

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10. Gold number is associated with :

A. Amount of gold

B. Protective colloids

C. Purle of cassius

D. Electrophoresis

Answer: B

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11. In a heterogeneous catalysis which of the following processes takes place

A. Absorption

B. Hydration

C. Adsorption

D. Intermediate compound

Answer: C

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12. Which one of the following electrolytes is most effective for the coagulation of $Fe(OH)_3 sol$ and why?

$NaCl$, Na_2SO_4, Na_3PO_4

A. NaCl

B. Na_2S

C. $(NH_4)_3PO_4$

D. K_2SO_4

Answer: A

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13. Which of the following is a lyophobic colloidal solutution

A. Aqueous starch solution

B. Aeuqous protein solution

C. Gold sol

D. Polymer solvent in some ogranic solvents

Answer: C

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14. each question constain STATEMENT-1(Assertion) and STATEMENT - 2 (reason). examine the statement carefully and work the correct answer accoridng to the instructions given below :

STATEMENT-1: Colloidal solutions are stable but colloidal particles do not settle down.

STATEMENT-2: Brownian movement counters the force of gravity act on collooidal particles

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

B. Both (A) and (R) true but (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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15. The homogenous catalysis is shown by

A. Haber 's process

$$N_2(g) + 3H_2(g) \xrightarrow{Fe(s)} 2NH_3(g)$$

B. Ostwald process

$$4NH_3(g) + 50_2(g) \xrightarrow{pt(s)} 4NO(g) + 6H_2O(g)$$

C. Contact proces

$$2SO_2(g) + O_2 \xrightarrow{Pt(s)} 2SO_3(g)$$

D. $2C_2H_5OH(aq) \xrightarrow{H_2SO_4(aq)}$

$$C_2H_5 - O - C_2H_5(aq) + H_2O(I)$$

Answer: D

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16. Which of the following statements are true for hydrophilic solution ?

A. They do not require electrolytes for stability

B. Their coagulation is irreversible

C. Their surface tension is usually lower than that of dipersion medium

D. Their viscosity is of the order of that of water

Answer: A:C

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17. Which of the following properties are related to physical adsorption ?

A. Reversible

B. Formation of unimolecular layer

C. Low heat of adsorption

D. Occurs at high temperature

Answer: A::C

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18. The best condition for hetergeneous catalysis is

A. Adsorption

B. Absorption

C. Diffusion

D. Occulusion

Answer: A

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19. 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 powers is

A. $D < A < C < B$

B. $C < B < D < A$

C. $A < C < B < D$

D. $B < D < A < C$

Answer: C

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20. Which of the following statements is incorrect regarding physissorptions ?

A. It occurs because of vander Waal's forces .

B. More easily liquefiable gases are adsorbed readily.

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

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

Answer: D

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21. Select the incorrect statement

A. Physical adsorption is reversible while chemical is irreversible

B. High pressure favours physical adsorption while low pressure favours chemical adsorption

C. Physical adsorption is not specific while chemical is highly specific

D. High activation energy is involved in chemical adsorption

Answer: B

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22. Four different colloids have the following gold number, which one has most effective action?

A. 10

B. 30

C. 20

D. 40

Answer: A

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23. Adsorption is an exothermic process. The amount of substance adsorbed should

A. Increase with decrease in the temperature

B. Increase with increase in temperature

C. Decrease with decrease in temperature

D. Decrease with increase in temperature

Answer: A

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24. Fog is a colloidal solution of

A. Liquid particles dispresed in gas

B. Gaseous particles dispersed in a liquid

C. Solid particles dispersed in a liquid

D. Solid particles dispersed in gas

Answer: A

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25. Which characteristic is not associated with chemical adsorption?

A. Is irreversible

B. Forms monolayer

C. Not very specific

D. Heat of adsorption $> 50kJmol^{-1}$

Answer: C

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26. Positve Catalyst

A. lowers activation energy

B. increases activation energy

C. may increase or may decrease activation energy

D. brings out equilibrium

Answer: A

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27. The protecting power of lyophilic colloidal sol is expressed in terms of

A. Gold number

B. Critical miscelle concentration

C. Oxidation number

D. Coagulation value

Answer: A

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

A. between 2 and 4 in all cases

B. 1 in case of physical adsorption

C. 1 in case of chemisorption

D. between 0 and 1 in all cases

Answer: D

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29. Which one of the following statements is incorrect about enzyme catalysis ?

A. Enzymes are denaturated by ultraviolet rays and at high 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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30. According to Hardy schultz law, the floculating power of an ion increases with :-

A. Decreases in size

B. increse in size

C. Decrease in charge

D. Increase in charge

Answer: D

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31. Which property of colloids is not dependent on the change on colloidal particles?

A. Coagulation

B. Electrophoresis

C. Electro -osmosis

D. Tyndall effect

Answer: D

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32. Which of the following statement is correct for the spontaneous adsorption of a gas?

A. ΔS is positive and therefore ΔH should also be highly positive

B. ΔS is negative and therefore ΔH should also be highly positive .

C. ΔS is negative and therefore ,ΔH should also be highly negative .

D. ΔS is positive and therefore ΔH should also be negative .

Answer: C

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33. Fog is a colloidal solution of

A. Gas in gas

B. Liquid in gas

C. Gas in liquid

D. Solid in gas

Answer: B

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34. The coagulation value in millimoles per litre of the electrolyes used for the coagulation of As_2S_3 are given below:

I. $(NaCl) = 52$, II. $(BaCl_2) = 0.69$

III. $(MgSO_4) = 0.22$

The correct order of their coagulating power is

A. $III > I > II$

B. $I > II > III$

C. $II > I > III$

D. $III > II > I$

Answer: D

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Exercise 4

1. Which of the folowing process does not occur at the interface of phases?

A. Crystallisation

B. Heterogenous catalysis

C. Homogeneous catalysis

D. Corrosion

Answer: C

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2. Extent of adsorption of adsorbate from solution phase increases with ..... .

A. increase in amount of adsorbate in solution

B. decrease in surface area of adsorbent

C. increase in temperature of solution

D. decrease in amount of adsorbate in solution

Answer: A

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3. In physisorption adsorbent does not show specificity for any particular gas because ..... .

A. Involved van der Waals forces are universal

B. gases involved behave like ideal gases

C. enthalpy of adsorption is low

D. it is a reersibel process

Answer: A

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4. Which of the following process is not responsible for the presence of electric charge on the sol particles?

A. Electron capture sol particles

B. Adsorption of ionic species from solution

C. Formation of Helmholtz electrical double layer

D. Absorption of ionic species from solution

Answer: D

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5. Which one of the following forms micelles in aqueous solution above certain concentration?

A. a,c

B. b,c

C. b,c

D. d,c

Answer: C

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6. Which of the following statements are correct about solid catalyst?

A. b,a

B. a, b

C. b,c

D. d,a

Answer: B

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7. Freundlich adsorption isotherm is given by the expression $\frac{x}{m} = kp^{1/n}$. Which of the following conclusions can be drawn from this expression ?

A. a,c

B. b,c

C. a,d

D. b,a

Answer: A

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8. An emulsion cannot be broken by $\cdots$ and

a) heating

b) adding more amount of dispersion medium

c) freezing

d) adding emulsifying agent

A. b,d

B. a,b

C. b,c

D. c,d

Answer: A

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9. What happens when lyophilic sol is added to a lyophobic sol?

A. c,a

B. a,c

C. d,a

D. b,a

Answer: B

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10. In a reaction catalyst changes

a) Physically b) qualitatively

c) Chemically d) quantitatively

A. a,b

B. b,c

C. d,a

D. a,c

Answer: A

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11. Which of the following phenomenon occurs when a chalk stick is dipped in ink?

A. d,a

B. d,c

C. a,b

D. a,d

Answer: D

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12. Why does the white precipitate of silver halide become coloured in the presence of dye eosin?

A. adsorption

B. absorption

C. physically adsortion

D. chemically adsortion

Answer: A::C

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13. On adding $AgNO_3$ solution into KI solution, a negatively charged coll oidal sol is obtained when they are in :

A. 100 ml of 0.1 M $AgNO_3 + 100$ ml of 0.1 M KI

B. 100 ml of 0.1 M $AgNO_3$ + 100 ml of 0.2 M KI

C. 100 ml of 0.2 M $AgNO_3 + 100$ ml of 0.1 M KI

D. 100 ml of 0.15 M $AgNO_3 + 100$ ml of 0.15 M KI

Answer: B

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14. 3.6 gram of oxygen of adsorbed on 1.2 g of metal powder. What volume of oxygen adsorbed per gram of the adsorbent at 1 atm and 273 K ?

A. $0.19Lg^{-1}$

B. $1Lg^{-1}$

C. $2.1Lg^{-1}$

D. $3.2Lg^{-1}$

Answer: C

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15. 100 mL of 0.6 M acetic acid is shaken with 2 g activatid carbon . The final concetration solution after adsorption is 0.5 M. what is the amount of acetifc acid adsorbed per gram of carbon ?

A. 0.6 g

B. 0.3g

C. 1.2 g

D. 2 g

Answer: B

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16. Plot of log against log P is a straight line inclined at an angle of 45°. When the pressure is 0.5 atm and Freundlich parameter ,K is 10, the amount of solute adsorbed per gram of adsorbent will be : (log 5=0.6990)

A. 1 g

B. 2g

C. 3 g

D. 5 g

Answer: D

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17. One gram of charcoal adsorbs 100 mL of 0.5 MCH_3COOH to form a mono-layer and thereby the molarity of acetic acid is reduced to 0.49 M. Calculate the surface area of the charcoal adsorbed by each molecule of acetic acid. Surface acid of charcoal $= 3.01 \times 10^2 m^2/gm$

A. $2.5 \times 10^{-19} m^2$

B. $5.0 \times 10^{-19} m^2$

C. $10^{-18} m^2$

D. $2.0 \times 10^{-18} m^2$

Answer: B

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18. 1.30 cm^3 of N_2 gas at STP is adsorbed per gram of silica gel. The area occupied by nitrogen molecule is 0.16 nm^2. What is the surface area per gram of silica gel ?

$\left(N_A = 6.023 \times 10^{23}\right)$

A. $1.6m^2g^{-1}$

B. $5.568m^2g^{-1}$

C. $3.48m^2g^{-1}$

D. $4.42m^2g^{-1}$

Answer: B

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19. Graph between $\log x/m$ and $\log p$ is a straight line inclined at an angle of 45° . When pressure is $0.5atm$ and $1nk = 0.693$,

the amount of solute adsorbed per gram of adsorbent will be:

A. 1g/g adsorbent

B. 1.5 g/g adsorbent

C. 2.5 g/g adsorbent

D. 0.25 g/g adsorbent

Answer: C

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20. 3.6 gram of oxygen of adsorbed on 1.2 g of metal powder. What volume of oxygen adsorbed per gram of the adsorbent at 1 atm and 273 K ?

A. 0.19 L

B. 1 L

C. 2.1 L

D. 3.1 L

Answer: C

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21. The coagulation of $200mL$ of a positive colloid took place when $0.73gHCl$ was added to it without changing the volume much. The flocculation value of HCl for the colloid is

a. 36.5 , b. 100 , c. 200 , d. 150

A. 0.365

B. 36.5

C. 100

D. 150

Answer: C

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22. In a coagulation experiment, $5mL$ of As_2S_3 is mixed with distilled water and $0.1M$ solution of an electrolyte AB so that the total volume is $10mL$. It was found that all solutions sontianing more than $4.6mL$. Of AB coagulate within 5 min. What is the flocculation value of AB for As_2S_3 solution?

A. 46

B. 86

C. 56

D. 40

Answer: A

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