CHEMISTRY

BOOKS - MTG WBJEE CHEMISTRY (HINGLISH)

SURFACE CHEMISTRY

Wb Jee Workout Single Option Correct Type

1. If an oil soluble dye is mixed with an emulsion and the emulsion remains

colourless, then it is _____type emulsion.

A. O-in-W

B. W-in-O

C. O-in-O

D. W-in-W

Answer: A

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2. A liquid is found to scatter a beam of light but leaves no residue when passed through the filter paper. The liquid can be described as

A. a suspension

B. an oil

C. a colloidal sol

D. a true solution.

Answer: C

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3. Bleeding due to a cut can be stopped by applying ferric chloride solution in the laboratory. This is due to

A. coagulation of negatively charged blood particles by Fe^{3+} ions

B. coagulation of positively charged blood particles by Cl^{-} ions

C. reaction taking place between ferric ions and the haemoglobin forming a complex

D. common element iron, in both $FeCl_3$ and haemoglobin.

Answer: A

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4. The equation for Freundlich adsorption isotherm under high pressure is

A. $\frac{x}{m} \propto p^{1/n}$

B. $\frac{x}{m} \propto p^{\circ}$

C. $\frac{x}{m} \propto \frac{1}{p}$

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

Answer: B

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5. The decomposition of H_2O_2 may be checked by adding a small quantity of phosphoric acid. This is an example of

A. autocatalysis

B. negative catalysis

C. positive catalysis

D. catalytic promotion.

Answer: B

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

A. true solution > suspension > colloidal

B. suspension > true solution < colloidal

C. suspension > colloidal > true solution

D. true solution > colloidal > suspension.

Answer: C

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7. Glucose or fructose can be converted into ethanol in presence of

A. invertase

B. zymase

C. maltase

D. diastase.

Answer: B

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8. The curve showing the variation of pressure with temperature for a given amount of adsorption is called

A. adsorption isobar

B. adsorption isotherm

C. adsorption isostere

D. adsorption isochore.

Answer: C

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9. Which of the following can adsorb larger volume of hydrogen gas?

A. Finely divided nickel

B. Colloidal solution of palladium

C. Finely divided platinum

D. Colloidal $Fe(OH)_3$

Answer: B

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10. In Rosenmund reaction, presence of $BaSO_4$ acts as .....for Pd.

A. promoter

B. moderator

C. inhibitor

D. poison

Answer: D

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11. A heterogeneous catalyst system follows

A. order kinetics in beginning and after some time it becomes a zero order reaction

B. only zero order kinetics

C. only I^{st} order kinetics

D. Li^{nd} order kinetics.

Answer: A

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12. Lyophilic colloids are stable due to

A. small size of the particles

B. large size of particles

C. charge on the particles

D. layer of dispersion medium on the particles.

Answer: D

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13. Movement of particles when electricity is passed through a colloidal solution is called as

A. Brownian movement

B. cataphoresis

C. electro-osmosis

D. Tyndall effect.

Answer: B

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14. Adsorption of gases on solid surface is an exothermic eaction because

A. free energy increases

B. enthalpy is positive

C. entropy increases

D. enthalpy is negative.

Answer: D

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15. A catalyst

A. changes the equilibrium constant

B. lowers the activation energy

C. increases the forward and backward reactions at different speeds

D. follows same mechanism for the reaction.

Answer: B

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16. Which of the following statements is not correct regarding the adsorption of a gas on the surface of a solid?

A. On increasing temperature, adsorption increases continuously.

B. Enthalpy and entropy change is negative

C. Adsorption is more for some specific substances.

D. It is a reversible reaction

Answer: A

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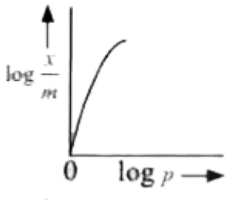
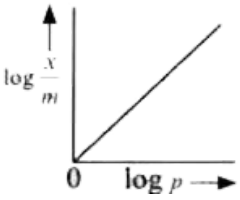
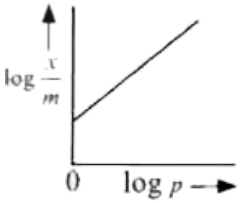
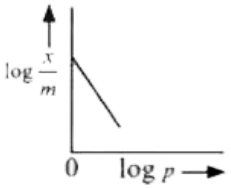
17. Freundlich adsorption isotherm $x/m = kp^{1/n}$ may be graphically represented as

A. 

B. 

C. 

D. 

Answer: C

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18. Micelles may be formed by aggregates of soap anions in water as the anions are

A. hydrophilic

B. hydrophobic

C. diphilic (one hydrophilic head being attached to a long hydrophobic tail)

D. carriers of electricity.

Answer: C

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19. In which of the following processes is autocatalysis involved?

A. Oxidation of $FeSO_4$ with acidified $KMnO_4$

B. Combustion of CO to CO_2

C. Oxidation of $FeCl_3$ to $Fe(OH)_3$

D. Conversion of alkanes to alkenes.

Answer: A

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20. Mark the false statement

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

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

C. The colloidal solution of a liquid in liquid is called gel.

D. Hardy-Schulze rule is related with coagulation.

Answer: C

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21. What is the significance of 'Gold number"?

A. It measures the stability of colloidal system.

B. It measures the protective power of a colloid.

C. It measures the size of colloidal particles.

D. All of these

Answer: B

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22. Which of the following does not influence the chemical equilibrium of a reversible reaction?

A. Temperature change

B. Catalyst

C. Pressure change

D. Increase in concentration of reactants.

Answer: B

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23. Dyeing of fibre involves the process of

A. adsorption

B. absorption

C. sorption

D. all of these

Answer: C

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24. Identify the correct statement regarding enzymes.

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

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

C. Enzymes are specific biological catalysts that cannot be poisoned.

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

Answer: D

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25. Organic catalysts differ from inorganic catalysts in

A. acting at a very high temperature

B. being proteins

C. being consumed in the reaction

D. acting at very low temperature.

Answer: B

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26. Amongst the following statements, which is incorrect?

A. The ceaseless zig-zag motion of sol particles is due to the unbalanced bombardment of particles by the molecules of dispersion medium

B. The intensity of zig-zag motion increases with the increase in the size of the

particles.

C. The zig-zag motion of particles becomes intense at high temperature.

D. This motion has a stirring effect which does not permit the particles to settle.

Answer: B

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27. The name aquadag is given to the colloidal solution of

A. graphite in water

B. platinum in water

C. copper in water

D. none of these.

Answer: A

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28. Gelatin is mostly used in making ice-cream in order to

A. prevent formation of a colloid

B. stabilize the colloid and prevent crystallisation

C. stabilize the mixture

D. enrich the aroma.

Answer: B

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29. 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. convection currents

Answer: C

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30. Among the electrolytes $Na_2SO_4, CaCl_2, Al_2(SO_4)_3$ and NH_4Cl_4 , 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

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31. Gold number of few colloids are given below:

Gelatin = 0.005 Strach = 25 .

Egg albumin = 0 .08 Gum arabic = 0.10

Which is the best protective colliad ?

A. Gelatin

B. Strach

C. Egg albumin

D. Gum arabic

Answer: A

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32. The volumes of gases H_2, CH_4, CO_2 and NH_3, adsorbed by 1 g charocal at 298 K are in the order .

A. $H_2 > CH_4 > CO_2 > NH_3$

B. $CH_4 > CO_2 > NH_3 > H_2$

C. $CO_2 > CO_2 > H_2 > CH_4$

D. $NH_3 > CO_2 > CH_4 > H_2$

Answer: D

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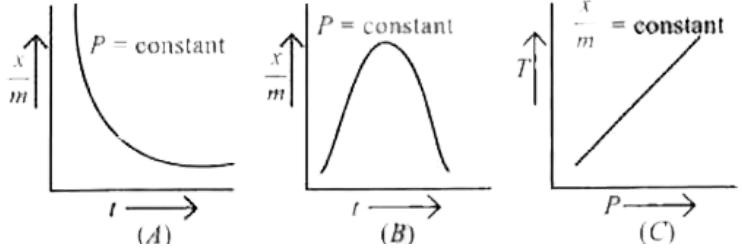
33. Study the given graphs and select the correct statement regarding them.



A. Graph (A) represents physisorption isobar.

B. Graph (B) represents chemisorption isobar.

C. Graph (C) represents an adsorption isostere.

D. All of these

Answer: D

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34. On addition of one mL of 10% NaCl solution to 10 mL gold sol in the presence of 0.25 g of starch, the coagulation is just prevented. Starch has the gold number

A. 0.025

B. 0.25

C. 2.5

D. none of these.

Answer: D

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35. 50 ml of 1 M oxalic acid is shaken with 0.5 g wood charcoal. The final concentration of the solution after adsorption is 0.5 M. What is the amount of oxalic acid adsorbed per gram of carbon?

A. 3.15 g

B. 3.45 g

C. 6.30 g

D. none of these.

Answer: A

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36. 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 kl

B. 100 mL of 0.1 M $AgNO_3$ + 50 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 0.1 M $AgNO_3$ + 100 mL of 0.15 M KI

Answer: D

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37. Which of the following statements are correct?

(i) Smaller the gold number of lyophilic colloid, the larger will be its protective power.

(ii) Lyophilic sols, in contrast to lyophobic sols can easily coagulate on addition of small amounts of electrolytes.

(iii) Ferric chloride solution is used to stop bleeding from a fresh cut because it coagulates the blood.

(iv) The flocculation value of arsenious

sulphide solis independent of the anion of the coagulating electrolyte.

A. (i),(ii) and (iii)

B. (i),(iii) and (iv)

C. (ii),(iii) and (iv)

D. (i) , (ii) and (iv)

Answer: B

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38. Which of the following will be most effective in causing the coagulation of a colloidal system in which particles move towards the cathode in an electric field?

A. K_2SO_4

B. Na_3PO_4

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

D. $NaCl$

Answer: C

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39. 400 mL of standard gold sol is just prevented from coagulation by the addition of 0.96 g of starch before adding 1 mL of 10% NaCl solution, the gold number will be

A. 2.4

B. 76

C. 240

D. 24

Answer: D

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40. If 0.2 g of fine animal charcoal is mixed with half litre of acetic acid (1 M) solution and shaken for 30 minutes

A. concentration of the solution remains same

B. concentration of the solution increases

C. concentration of the solution decreases

D. none of these.

Answer: C

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41. Which of the following statements is correct?

A. Ba^{2+} coagulates As_2S_3 more effectively than Fe^{3+}

B. Na^+ coagulates As_2S_3 more effectively than Ba^{2+}

C. Na^+ coagulates As_2S_3 more effectively than Fe^{3+}

D. Fe^{3+} coagulates As_2S_3 more effectively than Ba^{2+}

Answer: D

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42. $10^{-4}g$ of gelatin is required to be added to $100cm^3$ of a standard glod solution of just prevent its precipitation by the addition of $1cm^3$ of 10% NaCl solution to it . Hence , the glod number of gelation in mg is .

A. 10

B. 0.01

C. 0.001

D. 0.1

Answer: B

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

(i) The extent of adsorption is equal to kph according to Freundlich isotherm

(ii) The extent of adsorption is equal to kp in according to Freundlich isotherm

(iii) At high pressure, extent of adsorption becomes independent of pressure.

(iv) Freundlich adsorption isotherm fails at low pressure

A. (i) and (ii)

B. (ii) and (iii)

C. (i)and (iv)

D. (iii) and (iv)

Answer: B

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44. For a gas - solid adsorbent system , the adsorption isotherm $\frac{x}{m} = kp^{1/m}$ is applicable , where n =5 in the specified case . Select the correct statement.

A. $\frac{x}{m}$ vs p plot is a linear graph with slope equal to 5.

B. $\frac{\log(x)}{m}$ vs log p plot is a straight line with slope equal to 5.

C. $\frac{\log(x)}{m}$ vs log p is a straight line with slope equal to 0.2.

D. None of these

Answer: C

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45. The dispersed phase in colloidal iron (III) hydroxide and colloidal gold is positively and negatively charged respectively. Which of the following statements is not correct?

A. Mixing the sols has no effect.

B. Coagulation in both sols can be brought about by electrophoresis.

C. Magnesium chloride solution coagulates the gold sol more readily than the iron (III) hydroxide sol.

D. Sodium sulphate solution causes coagulation in both sols.

Answer: A

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Wb Jee Workout One Or More Thanone Option Correct Type

1. Colloidal sol found effective in treating eye disease is

A. colloidal sulphur

B. colloidal antimony

C. colloidal gold

D. colloidal silver.

Answer: D

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2. Which of the following is an example of Tyndall effect?

A. Blue colour of sea water

B. Twinkling of stars

C. Visibility of tails of comets

D. All of these

Answer: D

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3. Which of the following is a property of colloid?

A. Brownian movement

B. Heterogeneous nature

C. High instability

D. Scattering of light

Answer: A

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4. Which of the following is positively charged sol?

A. $Cr(OH)_3$ sol

B. TiO_2 sol

C. Gold sol

D. Methylene blue sol

Answer: A

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5. Bredig's arc method cannot be used to prepare colloidal solution of

A. Pt

B. Fe

C. Ag

D. Au

Answer: B

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6. The correct features of the enzymes are

A. they are mainly globular proteins

B. they show maximum activity at $37^{\circ} C$

C. each enzyme can catalyse a large number of biological reactions

D. the enzymes present in yeast are invertase and zymase only.

Answer: A::B

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7. At critical micelle concentration (CMC)

A. the ions of surfactant molecules undergo association to form clusters

B. the turbidity of solution increases abruptly

C. substances like grease, fats, etc. dissolve colloidally

D. colligative properties increase suddenly.

Answer: A::B::C

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8. 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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9. The correct statements about adsorption are

A. the chemisorption of H_2 as H atoms on the surface of glass is endothermic

B. physical adsorption does not require activation energy

C. chemisorption is always unimolecular

D. in adsorption, only solute from the solution is adsorbed on the surface of

the solid adsorbent.

Answer: A::B::C

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10. The correct statement(s) pertaining 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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Wb Jee Previous Years Questions

1. The amount of electrolytes required to coagulate a give amount of AgI colloidal solution (-ve charge) will be in the order .

A. $NaNO_3 > Al(NO_3)_3 > Ba(NO_3)_2$

B. $Al(NO_3)_3 > Ba(NO_3)_2 > NaNO_3$

C. $Al(NO_3)_2 > NaNO_3 > Ba(NO_3)_2$

D. $NaNO_3 > Ba(NO_3)_2 > Al(NO_3)_3$

Answer: D

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2. The dispresed phase and dispersion medium of fog respectively are .

A. soild , liquid

B. liquid, liquid

C. liquid,gas

D. gas , liquid

Answer: C

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3. Point out the flase statement .

A. Colloidal sols are homogeneous

B. Colliods carry + ve or - ve charges

C. Colloids show Tyndall effect.

D. The size range of colloidal particle is $10 - 1000\text{Å}$

Answer: A

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