CHEMISTRY

BOOKS - CHEMISTRY

SURFACE CHEMISTRY

Surface Chemistry

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

A. Crystallisation

B. Hetergeneous catalysis

C. Homogeneous catalysis

D. Corrosion

Answer: C

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2. At the equilibrium position in the process of adsorption .....

A. $\Delta H > 0$

B. $\Delta H = T\Delta S$

C. $\Delta H > T\Delta S$

D. $\Delta H < T\Delta S$

Answer: B

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3. Which of the following interface cannot be obtained?

A. Liquid-liquid

B. Solid-liquid

C. Liquid-gas

D. Gas-gas

Answer: D

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4. The term 'sorption' stands for ..... .

A. absorption

B. adsorption

C. Both absorption and adsorption

D. desorption

Answer: C

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5. Extent of physisorption of a gas increases with ..... .

A. increase in temperature

B. decrease in temperature

C. decrease in surface area of assorbent

D. decrease in strength of van der Waals' forces

Answer: B

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6. 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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7. Which one of the following is not applicable to the phenomenon of adsorption?

A. $\Delta H > 0$

B. $\Delta G < 0$

C. $\Delta S < 0$

D. $\Delta H < 0$

Answer: A

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8. Which is not correct for physical adsorption ?

A. High pressure

B. Negative ΔH

C. Higher critical temperature of adsorbate

D. High temperature

Answer: D

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9. Physical adsorption of a gaseous species may change to chemical adsorption with

A. decrease in temperature

B. increase in temperature

C. increase in surface area of adsorbent

D. decrease in surface area of adsorbent

Answer: B

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10. 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 reversible process

Answer: A

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11. Which of the following is an example of absorption?

A. Water on silica gel

B. Water on calcium chloride

C. Hydrogen on finely divided nickel

D. Oxygen on metal surface

Answer: B

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12. On the basis fo data given below predict which of the following gases shows least adsorption on a definite amount of charcoal?

Gas	CO_2	SO_2	CH_4	H_2
Critical temp./K	304	630	190	33

A. CO_2

B. SO_2

C. CH_4

D. H_2

Answer: D

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13. In which of the following reactions heterogeneous catalysis is involved?

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

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

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

(iv)

$CH_3COOCH_3(l) + H_2O(l) \xrightarrow{HCl(l)} CH_3COOH(aq) + CH_3OH(aq)$

A. (ii), (iii)

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

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

D. (iv)

Answer: C

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14. At high concentration of soap in water, soap behaves as ..... .

A. molecular colloid

B. associated colloid

C. macromolecular colloid

D. lyophilic colloid

Answer: B

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15. Which of the following will show Tyndall effect?

A. Aqueous solution fo soap below critical micelle concentration

B. Aqueous solution of soap above critical micelle concentration

C. Aqueous solution of sodium chloride

D. Aqueous solution of sugar

Answer: B

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16. Method by which lyophobic sol can be protected.

A. By addition of oppositely charged sol

B. By addition of an electrolyte

C. By addition of lyophilic sol

D. By boiling

Answer: C

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17. Freshly prepared precipitate sometimes gets converted to colloidal solution by ..... .

A. coagulation

B. electrolysis

C. diffusion

D. peptisation

Answer: D

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

A. Na_2S

B. Na_3PO_4

C. Na_2SO_4

D. NaCl

Answer: B

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19. A colloidal system having a solid substance as a dispersed phase and a liquid as a dispersion medium is classified as ..... .

A. solid sol

B. gel

C. emulsion

D. sol

Answer: D

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

A. exhibit enormous surface area

B. remain suspended in the dispersion medium

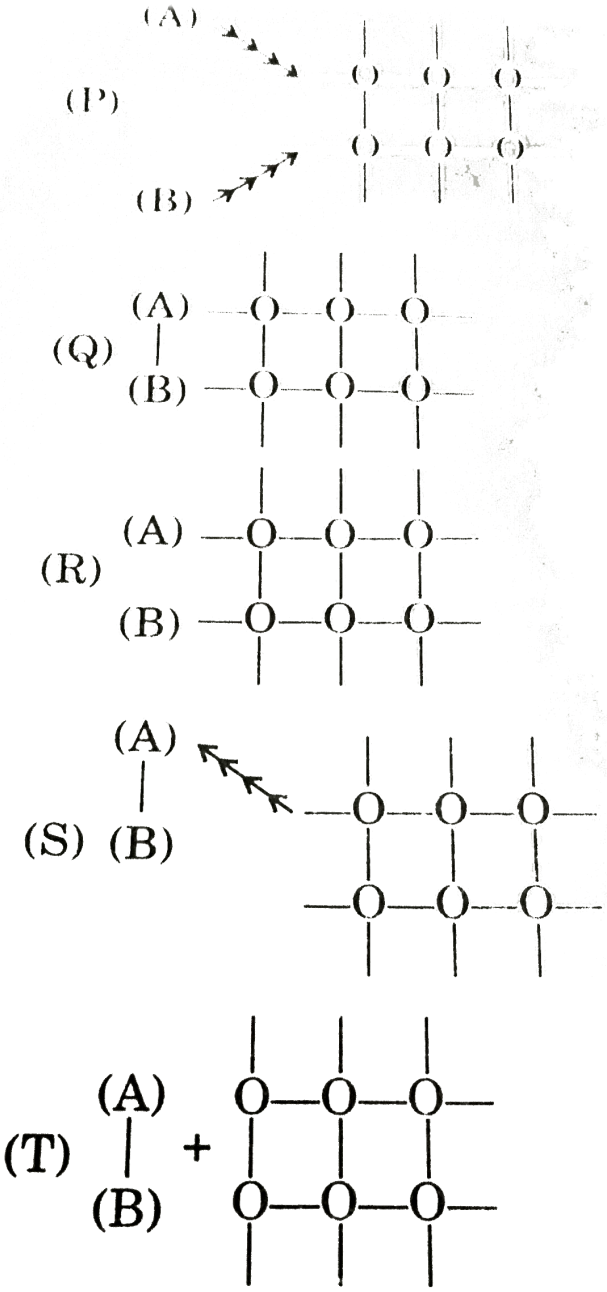
C. form lyophilic colloids

D. are comparatively less in number

Answer: D

21. Arrange the following diagrams in correct sequence of steps involved in the mechanism of catalysis, in accordance with modern

adsorption theory.



A. $I \rightarrow II \rightarrow III \rightarrow IV \rightarrow V$

B. $I \rightarrow III \rightarrow II \rightarrow IV \rightarrow V$

C. $I \rightarrow III \rightarrow II \rightarrow V \rightarrow IV$

D. $I \rightarrow II \rightarrow III \rightarrow V \rightarrow IV$

Answer: B

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22. Which of the following process is responsible for the formation of delta at a place where rivers meet the sea?

A. Emulsification

B. Colloid formation

C. Coagulation

D. peptisation

Answer: C

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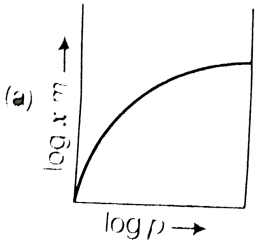
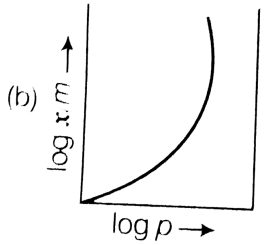
23. Which of the following curves is in according with Freundlich adsorption isotherm?

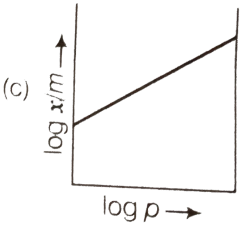
A.



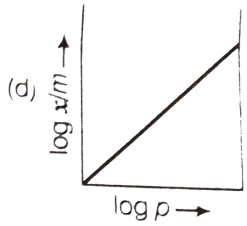
B.



C.



D.



Answer: C

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

A. Electron capture by 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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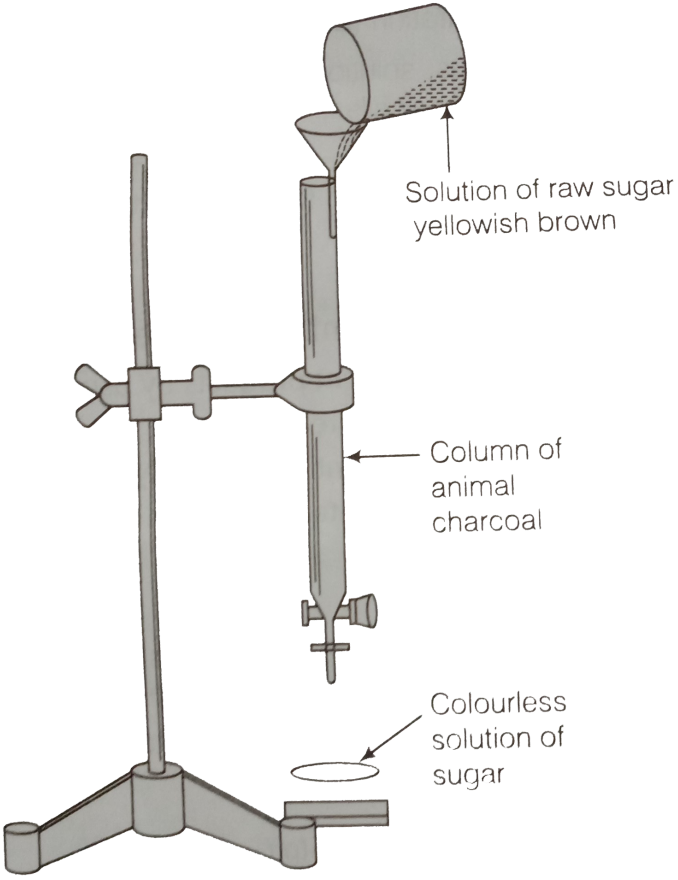
25. Which of the following phenomenon is applicable to the process shown in the figure?



A. Absorption

B. Adsorption

C. Coagulation

D. Emulsification

Answer: B

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26. Which of the following options are correct?

A. Micelle formation by soap in aqueous solution is possible at all temperatures

B. Micelle formation by soap in aqueous solution occurs above a particular concentration

C. On dilution of soap solution micelles may revert to individual ions

D. Soap solution behaves as a normal strong electrolyte at all concentrations

Answer: B::C

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

A. Same reactants may give different products by using different catalysts

B. Catalyst does not change ΔH of reaction

C. Catalyst is required in large quantities to catalyse reactions

D. Catalytic activity of a solid catalyst does not depend upon the strength of chemisorption

Answer: A::B

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

A. When $\frac{1}{n} = 0$, the adsorption is independent of pressure

B. When $\frac{1}{n} = 0$, the adsorption is directly proportional to pressure

C. When $n = 0$, $\frac{x}{m}$ vs p graph is a line parallel to x-axis

D. When $n = 0$, plot of $\frac{x}{m}$ vs p is a curve

Answer: A::C

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29. H_2 gas is adsorbed on activated charcoal to a very little extent in comparison to easily liquefiable gases due to ..... .

A. very strong van der Waals' interaction

B. very weak van der Waals' forces

C. very low critical temperature

D. very high critical temperature

Answer: B::C

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30. Which of the following statements are correct?

A. Mixing two oppositely charged sols neutralises their charges and stabilises the colloid

B. Presence of equal and similar charges on colloidal particles provides stability to the colloids

C. Any amount of dispersed liquid can be added to emulsion without destabilising it

D. Brownian movement stabilises sols

Answer: B::D

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31. An emulsion cannot be broken by .....and ..... .

A. heating

B. adding more amount of dispersion medium

C. freezing

D. adding emulsifying agent

Answer: B::D

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32. Which of the following substances will precipitate the negatively charged emulsions ?

A. KCl

B. Glucose

C. Urea

D. NaCl

Answer: A::D

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33. Which of the following colloids cannot be coagulated easily?

A. Lyophobic colloids

B. Irreversible colloids

C. Reversible colloids

D. lyophilic colloids

Answer: C::D

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34. What happens when a Lyophilic sol is added to a Lyophobic sol?

A. Lyophobic sol is protected

B. Lyophilic sol is protected

C. Film of lyophilic sol is formed over lyophobic sol

D. Film of lyophobic sol is formed over lyophilic sol

Answer: A::C

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35. Which phenomenon occurs when an electric field is applied to a colloidal solution and electrophoresis is prevented?

A. Reverse osmosis takes place

B. Electroosmosis takes place

C. Dispersion medium begins to move

D. Dispersion medium becomes stationary

Answer: B::C

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36. In a reaction, catalyst changes ..... .

A. physically

B. qualitatively

C. chemically

D. quanitatively

Answer: A::B

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

A. Adsorption of coloured substance

B. Adsorption of solvent

C. Absorption and adsorption both of solvent

D. Absorption of solvent

Answer: A::D

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38. Why is it important to have clean surface in surface studies ?

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39. Why is chemisorption referred to as activated adsorption?

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40. What type of solutions are formed on dissolving different concentrations of soap in water ?

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41. What happens when gelatin is mixed with gold sol ?

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42. How does it become possible to cause artificial rain by spraying silver iodide on the clouds?

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43. Gelatin which is a peptide is added in ice-creams. What can be its role ?

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44. What is collodion?

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45. Why do we add alum to purify water ?

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46. Which phenomenon occurs when an electric field is applied to a colloidal solution and electrophoresis is prevented?

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47. What causes Brownian motion in colloidal dispersion?

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48. A colloid is formed by adding $FeCl_3$ in excess of hot water. What will happen if excess sodium chloride is added to this colloid?

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49. How do emulsifiers stabilise emulsion ? Name two emulsifiers.

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50. Why are some medicines more effective in the colloidal form?

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51. Why does leather get hardened after tanning?

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52. How does the precipitation of colloidal smoke take place in Cottrell precipitator?

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53. How will you distiguish between dispersed phase and dispersion medium in an emulsion ?

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54. On the basis of Hardy-schulze rule explain why the coagulating power of phosphate is higher than chloride ?

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55. Why does bleeding stop by rubbing moist alum?

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56. Why is $Fe(OH)_3$ colloid positively charged when prepared by adding $FeCl_3$ to hot water ?

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57. Why do physisorption and chermisorption behave differently with rise in temperature ?

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58. What happens when dialysis is prolonged?

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

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60. What is the role of activated charcoal in gas mask used in coal mines?

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61. How does a delta form at the meeting place of sea and river water?

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62. Given an example where physisorption changes to chemisorption with rise in temperature. Explain the reason for change.

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63. Why is desorption important for a substance to act as good catalyst?

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64. What is the role of diffusion in heterogeneous catalyst?

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65. How does a solid catalyst enhance the rate of combination of gaseous molecules?

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66. Do the vital functions of the body such as digestion get affected during fever ? Explain your answer,

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67. Method of formation of solution is given in Column I. Match it with the type of solution given in Column II.

Column I	Column II
A. Sulphur vapours passed through cold water.	1. Normal electrolyte solution
B. Soap mixed with water above critical micelle concentration.	2. Molecular colloids
C. White of egg whipped with water.	3. Associated colloid
D. Soap mixed with water below critical micelle concentration.	4. Macromolecular colloids

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68. Match the statement given in Column I with the phenomenon given in Column II.

Column I	Column II
A. Dispersion medium moves in an electric field.	1. Osmosis
B. Solvent molecules pass through semipermeable membrane towards solvent side.	2. Electrophoresis
C. Movement of charged colloidal particles under the influence of applied electric potential towards oppositely charged electrodes.	3. Electroosmosis
D. Solvent molecules pass through semipermeable membranes towards solution side.	4. Reverse-osmosis

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69. Match the items given in Column I and Column II.

	Column I	Column II
$A.$	Protective colloid	1. $FeCl_3 + NaOH$
$B.$	Liquid-liquid colloid	2. Lyophilic colloids
$C.$	Positively charged colloid	3. Emulsion
$D.$	Negatively charged colloid	4. $FeCl_3 +$ hot water

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70. Match the types of colloidal systems given in Column I with the name given in Column II.

	Column I	Column II
A.	Solid in liquid	1. Foam
B.	Liquid in solid	2. Sol
C.	Liquid in liquid	3. Gel
D.	Gas in liquid	4. Emulsion

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71. Match the items of Column I and Column II.

Column I	Column II
A. Dialysis	1. Cleansing action of soap
B. Peptisation	2. Coagulation
C. Emulsification	3. Colloidal sol formation
D. Electrophoresis	4. Purification

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72. Match the items of Column I and Column II.

Column I	Column II
A. Butter	1. Dispersion of liquid in liquid
B. Pumice stone	2. Dispersion of solid in liquid
C. Milk	3. Dispersion of gas in solid
D. Paints	4. Dispersion of liquid in solid

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73. Assertion (A) An ordinary filter paper impregnated with collodion solution stops the flow of colloidal particles.

Reason (R) Pore size of the filter paper becomes more than the size of colloidal particle.

A. Assertion and reason both are correct and the reason is correct explanation of assertion.

B. Assertion and reason both are correct but reason does not explain assertion.

C. Assertion is correct, but reason is incorrect.

D. Both assertion and reason are incorrect.

Answer: C

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74. Assertion (A) Colloidal solution show colligative properties.

Reason (R) Colloidal particles are large in size.

A. Assertion and reason both are correct and the reason is correct explanation of assertion.

B. Assertion and reason both are correct but reason does not explain assertion.

C. Assertion is correct, but reason is incorrect.

D. Both assertion and reason are incorrect.

Answer: B

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75. Assertion (A) Colloidal solutions do not show Brownian motion.

Reason (R) Brownian motion is responsible for stability of sols.

A. Assertion and reason both are correct and the reason is correct explanation of assertion.

B. Assertion and reason both are correct but reason does not explain assertion.

C. Assertion is correct, but reason is incorrect.

D. Assertion is incorrect, but reason is correct.

Answer: A

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76. Assertion (A) Coagulation power of Al^{3+} is more than Na^{+}.

Reason (R) Greater the valency of the flocculating ion added,

greater is its power to cause precipitation (Hardy-Schulze rule) .

A. Assertion and reason both are correct and the reason is correct explanation of assertion.

B. Assertion and reason both are correct but reason does not explain assertion.

C. Assertion is correct, but reason is incorrect.

D. Assertion is incorrect, but reason is correct.

Answer: A

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77. Assertion (A) Detergents with low CMC are more economical to use.

Reason (R) Cleansing action of detergents involves the formation of

micelles. These are formed when the cocentration of detergents becomes equal to CMC.

A. Assertion and reason both are correct and the reason is correct explanation of assertion.

B. Assertion and reason both are correct but reason does not explain assertion.

C. Assertion is correct, but reason is incorrect.

D. Assertion is incorrect, but reason is correct.

Answer: A

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78. What is the role of adsorption in heterogeneous catalysis?

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79. What are the applications of adsorption in chemical analysis?

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80. What is the role of adsorption in froth floatation process used especially for concentration of sulphide ores?

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81. What do you understand by shape selective catalysis? Why are zeolites good shape selective catalysts?

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