CHEMISTRY

BOOKS - CHHAYA CHEMISTRY (BENGALI ENGLISH)

SURFACE CHEMISTRY

Numerical Examples

1. 1 mL of 10% NaCl solution is added to 10 mL of gold sol in the presence of 0.0250 g starch when coagulation of that sol is just prevented . What is the gold number of starch ?

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2. 1 mL of 10% NaCl solution on addition to $100cm^3$ standard gold sol in presence of 10^{-4} gelatin just prevents the coagulation of that sol. Find the gold number of gelatin.

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Warm Up Exercise

1. Define Adsorption

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2. Define Adsorbent

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3. Define Adsorbate

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4. Define Absorption

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5. Define sorption

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6. Distinguish between adsorption and absorption

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7. Adsorption is a surface phenomenon Explain

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8. Why do charcoal and silica gel act as very good adsorbents?

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9. What is desorption?

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10. Why does the adsorptive capacity of a solid adsorbent increases when it occurs in the form of fine subdivision?

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11. What happens when a piece of chalk is dipped into ink?

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12. In the study of adsorption of a solid, why is it necessary for the solid to have a clean surface ?

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13. Explain the causes of adsorption.

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14. Adsorption is an exothermic process. Give reason.

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15. At a certain temperature and pressure, ammonia gas is spontaneously adsorbed on the surface of finely divided charcoal. Predict the sign $(+ / -)$ of ΔG, ΔH and ΔS in the process.

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16. Define with an example of Physisorption .

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17. Define with an example of Chemisorption.

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18. Chemisorption is highly specific in nature, whereas physisorption is not. Give reason.

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19. Between H_2 and CO_2 gases, which one is likelt to exhibit a higher extent of physisorption on a given solid surface under identical set of conditions and why ?

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20. Chemisorption is irreversible in nature. Explain.

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21. Why the activation energy in chemisorption is high ?

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22. Differentiate between physical and chemical adsorption on the basis of the forces involved in adsorption.

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23. Differentiate between physical and chemical adsorption on the basis of the heat of adsorption

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24. Differentiate between physical and chemical adsorption on the basis of the reversible , irreversible nature.

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25. Differentiate between physical and chemical adsorption on the basis of the unimolecular/multimolecular layer.

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26. Differentiate between physical and chemical adsorption on the basis of the activation energy.

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27. Physical adsorption usually involves the formation of a multilayer of adsorbate molecules, while chemical adsorption is usually found to a involve the formation of monolayer of adsorption molecules. Explain the reason.

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28. Why is the heat of adsorption for a physical adsorption less compared to a chemical adsorption?

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29. Briefly discuss the extent of adsorption of gas on a solid depends on the nature of the adsorbate and adsorbent.

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30. Why is low temperature favourable for physisorption?

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31. Why is the extent of chemisorption higher at moderately high temperatures?

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32. What do you mean by an adsorption isotherm?

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33. Explain how adsorption of a gas on solids is affected by pressure.

Watch Video Solution

34. Write two different ways of activating a solid adsorbent.

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35. What do you mean by saturation pressure?

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36. Define a catalyst. What do you mean by catalysis?

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37. Define with an example of inhibitor .

Watch Video Solution

38. Define with an example of promoter .

Watch Video Solution

39. Define with an example of catalyst poison.

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40. What do you mean by activity of a catalyst?

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41. Explain homogeneous catalysis with an example.

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42. Explain heterogeneous catalysis with an example.

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43. Explain shape-selective catalysis with an example.

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44. Give an example of homogeneous catalysis occurring in gaseous phase

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45. Give an example of homogeneous catalysis occurring in solution medium.

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46. Give an example of heterogeneous catalysis, where the reactants are in gaseous and liquid state and the catalyst is in

solid state.

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47. Explain the role of heterogenous catalysis .

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48. What do you mean by 'active centre' of a solid catalyst ?

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49. What do you mean by selectivity of a catalyst ? Explain .

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50. What is an enzyme ? What are enzymes called biochemical catalysts ?

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51. Give two examples of enzymes-catalysed reactions.

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52. What do mean by co-enzyme and prosthetic group ?

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53. Name two important catalytic processes used in industry ?

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54. Define : True solution

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55. Define: Colloidal solution

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56. Define : suspension

Watch Video Solution

57. Define : kraft temperature

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58. Define Sol with an example.

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59. Define Aerosol with an example.

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60. Can mixing of two gases produce a colloid?

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61. What do you mean by lyophilic and lyophobic colloids? Give atleast four differences between them.

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62. Which type of colloid causes the depletion of ozone layer?

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63. Name the colloidal system for Fog

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64. Name the colloidal system for Smoke

Watch Video Solution

65. Name the colloidal system for Ruby glass

Watch Video Solution

66. Name the colloidal system for Cream

Watch Video Solution

67. Name the colloidal system for Cottage cheese

Watch Video Solution

68. Name the colloidal system for Cloud.

Watch Video Solution

69. Name the colloidal system for Punice stone

Watch Video Solution

70. Name the colloidal system for paint

Watch Video Solution

71. Name the colloidal system for Shoe polish

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72. Give an example of Multimolecular colloid.

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73. Give an example of Macromolecular colloid.

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74. Give an example of Associated colloid.

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75. What is an emulsion? What are the different types of emulsions? Give an example of each type.

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76. What happens when water is added to milk? From this, how can you infer about the type of emulsion milk belongs to ?

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77. What type of emulsions are cold cream and vanishing cream?

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78. What is an emulsifying agent? Give two examples.

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79. Distinguish between emulsification and de-emulsification.

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80. What are surfactants? Mention their types with an example of each.

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81. Write the molecular structure of sodium stearate. Identify its hydrophobic and hydrophilic parts.

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82. Identify the surfactants of $CH_3 - (CH_2)_{15} - (CH_3)_3 N^+ Cl^-$ compounds:

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83. Identify the surfactants of $CH_3 - (CH_2)_{16} - CH_2 SO_4 Na$ compounds:

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84. What is peptisation ?

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85. Give examples of any two colloids that are prepared by the Bredig's arc method.

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86. Write one method each for the preparation of gold and sulphur sol.

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87. Write a method of preparation of ferric hydroxide sol.

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88. What is dialysis? Give one application of it.

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89. On which principle does an artificial kidney work?

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90. Give an example of a sol that can be prepared both by Bredig's arc and reduction method.

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91. What is Brownian movement? Why do colloidal particles do not settle down?

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92. Why are the magnitudes of colligative properties of colloidal solutions lower than those of true solutions?

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93. You are supplied with two solutions, one of which is a soap solution and another is a sugar solution. How do you identify them as true solution or colloid?

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94. Why does the path of light become visible when passed through a colloidal solution?

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95. Why is Tyndall effect not very distinct in the case of lyophilic colloids?

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96. Define the Electrophoresis

Watch Video Solution

97. Define the Cataphoresis

Watch Video Solution

98. Define the Anaphoresis

Watch Video Solution

99. Define the Electro-osmosis .

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100. Give an example each of an sol exhibiting cataphoresis and anaphoresis .

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101. What do you mean by isoelectric point of colloid ? Mention one important significance of it.

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102. Why is a medicine in colloidal state found to be very effective ?

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103. Addition of an excess solution of $AgNO_3$, to a solution of KI gives a positively charged AgI sol, while addition of an excess solution of KI to a solution of $AgNO_3$, results is a negatively charged AgI sol. Explain with reasons.

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104. Particles of $Fe(OH)_3$, sol produced in the hydrolysis of $FeCl_3$, are positively charged but the particles of As_2S_3 sol obtained in the reaction of As_2S_3, with H_2S are negatively charged. Explain.

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105. Why are lyophilic sols more stable than lyophobic sols?

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106. What are protective colloids? Give an example.

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107. Less the gold number of a lyophilic colloid, more is its protective power'- Justify.

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108. What do you mean by coagulation of a colloid? Write the Hardy-Schulze rule regarding coagulation.

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109. Na_2SO_4 is more effective than NaCl in the coagulation of $Fe(OH)_3$, sol. Give reason.

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110. Which of the following is required in least amount for the coagulation of As_2S_3 sol , $NaCl$, $Al_2(SO_4)_3$, K_2SO_4, $CaCl_2$.

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111. On applying alum to cuts and wounds, bleeding stops. Explain.

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112. Why is delta formed at the confluence of the river with sea ?

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113. Why does the colour of sky appear blue ?

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114. What makes nanomaterial so special ?

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115. State three applications of nanoparticle ?

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116. What are the dimensions of the Nanotubes .

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117. What are the dimensions of the Quantum dots

Watch Video Solution

118. What are the dimensions of the Nanofilms.

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Question Answer Zone For Board Examination

1. Why do charcoal, silica gel, alumina gel, ete. act as very good adsorbents?

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2. Identify the process as 'adsorption' or "absorption'. NH_3 gas in presence of charcoal in a closed vessel.

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3. Identify the process as 'adsorption' or "absorption'. NH_3 gas in contact with water.

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4. Identify the process as 'adsorption' or "absorption'. Water vapour in presence of anhydrous $CaCl_2$.

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5. What will be the signs of the following thermodynamic quantities for the adsorption of a gas on a solid at constant temperature and pressure? $\Delta G, \Delta S, \Delta H$.

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6. Between physisorption and chemisorption, which one has a higher activation energy?

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7. Between physisorption and chemisorption, which one has a lower heat of adsorption?

Watch Video Solution

8. A finely divided adsorbent shows greater adsorption than a granular adsorbent. Why?

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9. Why is the extent of chemisorption low at a lower temperature?

Watch Video Solution

10. Sulfur exhibits Brownian movement in water but not in carbon disulphide. Why?

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11. Classify as homogeneous or heterogeneous catalysis: Hydrogenation of oil in the presence of finely divided nickel as

catalyst .

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12. Classify as homogeneous or heterogeneous catalysis: Hydrolysis of aqueous sucrose solution in the presence of dilute HCl as catalyst.

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13. You are given two solutions, one of which is a concentrated solution of soap and the other is a solution of sugar. How can you ascertain whether they are true solutions or colloidal solutions?

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14. What are the dispersed phase and dispersion medium in foam?

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15. Give an example of an anionic surfactant and a cationic surfactant.

Watch Video Solution

16. What do you mean by the statement-'Gold number of starch is 20'?

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17. Which type of emulsions are vanishing cream, butter, milk, cod liver oil?

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18. Write any two methods of de-emulsification.

Watch Video Solution

19. By making use of which colloidal property can the Avogadro's number be determined?

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20. What is aquadug?

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21. Differentiate between colloid and crystalloid.

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22. How can you distinguish between a true solution and a colloidal solution by a simple physical process in the laboratory? Mention an industrial application of a physical property of the colloidal system which is used in the above process.

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23. Give two distinguishing features of chemisorption which cannot be seen in physisorption.

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24. Why is physisorption not an independent phenomenon?

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25. Which experiments can help us to determine the charge on sol particles?

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

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27. What will happen if KCl is added to a positively charged ferric oxide sol?

Watch Video Solution

28. Between $BaCl_2$ or KCl which one is more effective for the coagulation of a negatively charged sol?

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29. What will happen if a few drops of HCl is added to freshly prepared precipitate of $Fe(OH)_3$?

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Solved Wbchse Scanner

1. Which of the following is the most effective in bringing about the coagulation of AgI/I^- sol-

A. $NaNO_3$

B. Na_2SO_4

C. $Ca(NO_3)_2$

D. $Al_2(SO_4)_3$

Answer: D

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2. What is a micelle? Give two examples of micelle forming substances.

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3. Explain the formation of delta at the mouth of the river where it meets the sea.

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4. What happens when NaCl solution is added to a gold sol?

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5. Which of the following colloidal systems does correctly represent fog-

A. gas dispersed in a liquid

B. gas dispersed in a gas

C. solid dispersed in a gas

D. liquid dispersed in a gas

Answer:

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6. Write two differeneces between physisorption and chemisorption.

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7. Explain why the solid catalyst is used in a finely divided form in case of heterogeneous catalysis.

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8. What is observed when visible light is passed through a hydrophobic colloidal solution?

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9. The process by which alum purifies turbid water is-

A. absorption

B. adsorption

C. coagulation

D. dispersion

Answer:

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10. For which phenomenon colloidal particles do not settle down?

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11. A U-tube is completely filled with Fe(OH)_3 sol and a potential difference is applied by Pt-electrodes immersed in each of the two arms. Towards which electrode will the sol particles move and why?

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12. What are the dispersed phase and dispersion medium in soap lather ?

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13. Which one has the highest coagulating power for ferric hydroxide sol -

A. KCl

B. K_2SO_4

C. Na_3PO_4

D. $NaCl$

Answer:

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14. The particles of true solution can pass through a semi permeable membrane, but those of a colloidal solution cannot. Explain why?

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15. What is chemisorption? Explain with an example.

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Solved Cbse Scanner

1. What is meant by coagulation of a colloidal solution?

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2. Describe briefly any three methods by which coagulation of lyophobic sols can be carried out.

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3. Name the two groups into which phenomenon of catalysis can be divided. Give an example of each group with the chemical equation involved.

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4. What are the dispersed phase and dispersion medium in milk?

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5. Give reasons for the Leather gets hardened after tanning

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6. Describe the Dialysis

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7. Out of $MgCl_2$ and $AICI_3$, which one is more effective in causing coagulation of negatively charged sol and why?

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8. Out of sulphur sol and proteins, which one forms multimolecular colloids?

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9. What is the reason for the stability of colloidal sols?

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10. Define the Lyophilic colloid

Watch Video Solution

11. Define the Zeta potential

Watch Video Solution

12. Define the Associated colloidals.

Watch Video Solution

13. Write one difference of Lyophobic sol and lyophilic sol

Watch Video Solution

14. Write one difference of Solution and Colloid.

Watch Video Solution

15. Write one difference of Homogenous catalysis and heterogenous catalysis .

Watch Video Solution

16. Write one similarity between physisorption and chemisorption.

Watch Video Solution

17. Write one difference between of Multimolecular colloid and macromolecular colloid

Watch Video Solution

18. Write one difference between of Sol and gel.

Watch Video Solution

19. Write one difference between of Oil-in-water emulsion and water-in-oil emulsion.

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Watch Video Solution

20. What type of colloid is formed when a liquid is dispersed in a solid? Give an example.

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21. Write one difference of Multimolecular colloid and associated colloid

Watch Video Solution

22. Write one difference of Coagulation and peptisation

Watch Video Solution

23. Write one difference of Homogenous catalysis and heterogenous catalysis

Watch Video Solution

24. Milk is an emulsion. Identify the dispersed phase and the emulsifier in milk.

Watch Video Solution

25. Write one similarity between physisorption and chemisorption.

Watch Video Solution

26. Write the chemical method by which $Fe(OH)_3$ sol is prepared from $FeCl_3$.

Watch Video Solution

27. What type of colloid is formed when a solid is dispersed in a liquid? Give an example.

Watch Video Solution

28. What type of colloid is formed when gas is dispersed in a liquid ? Give an example .

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29. CO(g) and $H_2(g)$ react to give different products in the presence of different catalysts. Which ability of the catalyst is shown by these reactions ?

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30. What happens when: a freshly prepared precipitate of $Fe(OH)_3$ is shaken with a small amount of $FeCl_3$ solution ?

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31. What happen when :persistent dialysis of a colloidal solution is carried out ?

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32. What happen when : an emulsion is centrifuged ?

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Solved Necrt Textbook Problems

1. Write any two characteristics of chemisorption.

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

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3. Why are powdered substances more effective adsorbents than their crystalline forms ?

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4. What is the role of desorption in catalysis ?

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5. In Haber's process, H_2 is obtained by reacting methane with steam in presence of NiO as catalyst . The process is known as steam reforming . Why is it necessary to remove CO when NH_3 is obtained by Haber's process ?

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6. Why is the ester hydrolysis slow in the beginning and becomes faster after sometime ?

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7. What modification can you suggest in the Hardy Schulze law?

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

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9. Distinguish between the meaning of the terms adsorption and absorption. Give one example of each.

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10. Write two differeneces between physisorption and chemisorption.

Watch Video Solution

11. Give reason why a finely divided substance is more effective as an adsorbent.

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12. What are the factors which influence the adsorption of a gas on a solid?

Watch Video Solution

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

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14. How are the colloidal solutions classified on the basis of physical states of the dispersed phase and dispersion medium?

Watch Video Solution

15. Discuss the effect of pressure and temperature on the adsorption of gases on solids.

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

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17. What is the difference between multimolecular and macromolecular colloids? Give one example of each. How are associated colloids different from these two types of colloids?

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18. What are enzymes ? Write in brief the mechanism of enzyme catalysis.

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19. How are colloids classffied on the basis of physical states of components.

Watch Video Solution

20. How are colloids classffied on the basis of nature of dispersion medium .

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21. How are colloids classffied on the basis of interaction between dispersed phase and dispersion medium ?

Watch Video Solution

22. Explain what is observed when a beam of light is passed through a colloidal sol.

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23. Explain what is observed when an electrolyte NaCl is added to hydrated ferric oxide sol.

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24. Explain what is observed when electric current is passed through a colloidal sol ?

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25. What is de-emulsification? Name two de-emulsifiers.

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26. Action of soap is due to emulsification and micelle formation. Comment

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27. Give four examples of heterogeneous catalysis.

Watch Video Solution

28. What do you mean by activity & selectivity of catalysts?

Watch Video Solution

29. Describe some features of catalysis by zeolites.

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30. What is shape selective catalysis?

Watch Video Solution

31. Explain the Electrophoresis term.

Watch Video Solution

32. Explain the Coagulation

Watch Video Solution

33. Explain the Dialysis term

Watch Video Solution

34. Give four uses of emulsions

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35. Explain the Alcosol terms with suitable examples.

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36. Explain the Aerosol terms with suitable examples.

Watch Video Solution

37. Explain the Hydrosol terms with suitable examples.

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

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Higher Order Thinking Skill Hots Questions

1. Why do the surface particles of an adsorbent possess residual field of force?

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2. Alum is used to treat minor cuts after shaving . Explain.

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3. Sugar and area can easily pass through semi-permeable (animal) membrane from their aqueous solutions but glue and gelatin, in

their aqueous solutions, do not have free passage through it. Explain.

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4. In the coagulation of arsenlous sulphide, $Al(NO_3)_3$ is a better coagulating agent than KNO_3. Explain.

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5. Differentiate between electrophoresis & electrolysis.

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6. Colloidal sols prepared by different methods differ in colour'- Explain with reason.

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7. When arsenious sulphide sol is added to ferrie hydroxide sol, both of them are precipitated-why?

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8. A bucket of turbid river water does not become clear even on standing for a long time. Why? How can you make this turbid water clear? Explain.

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9. Addition of excess $AgNO_3$ to NaCl solution gives positively charged AgCl sol, while $AgNO_3$ solution on treating with excess of

NaCl solution yields negatively charged AgCl sol. Explain with reason.

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10. Smoke emitted by burning cigarette sometime appears to be light blue-Why?

Watch Video Solution

11. Why does the colour of the sun appear red during sunset?

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12. In acidic medium , particles of the sol formed by SnO_2 are positively charged. But in alkaline medium, particles of the sol

carry a negative charge-Explain.

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13. Soap or similar kind of substances are called colloidal electrolytes-Explain.

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14. How can artificial rain be caused by spraying Agl ?

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15. Rising temperature has an opposite effect on physisorption and chemisorption. Explain the reason.

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16. In an experiment involving adsorption of a gas on a solid at different pressures of the gas, the values of $\log\left(\frac{x}{m}\right)$ obtained are plotted against logp. This gives a straight line inclined at an angle of 45°. If the value of Freundlich's constant is 10, then what would be the amount of adsorbed gas per gm of adsorbent, when equilibrium pressure is 0.5 atm?

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Extrance Question Bank

1. The amount of electrolytes required to coagulate a given amount of Ag 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. $Al(NO_3)_3 > NaNO_3 > Ba(NO_3)_2$

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

Answer:

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2. The dispersed phase and dispersion medium of fog respectively are -

A. solid, liquid

B. liquid, liquid

C. liquid, gas

D. gas, liquid

Answer:

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3. Which of the following is an anionic detergent

A. Sodium stearate

B. sodium lauryl sulphate

C. cetytrimethyl ammonium chloride

D. glyceryl oleate

Answer:

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4. According to Freundlich adsorption isotherm, which of the following is correct-

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

B. $\frac{x}{m} \propto P^{\frac{1}{n}}$

C. $\frac{x}{m} \propto P^{0}$

D. all are correct for different ranges of pressure

Answer:

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5. The coagulating power of electrolytes having ions Na^{+}, Al^{3+} and Ba^{2+} for arsenic sulphide sol increases in the order-

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

B. $Na^{+} < Ba^{2+} < Al^{3+}$

C. $Ba^{2+} < Na^{+} < Al^{2+}$

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

Answer:

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6. 3g of activated charcoal was added to 50 mL of acetic acid solution (0.06N) in a flask. After an hour it was filtered andn the strength of the filtrate was found to be 0.042 (N). The amount of acetic acid absorbed (per gram of charcoal) is-

A. 18 mg

B. 36 mg

C. 42 mg

D. 54 mg

Answer:

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7. For a linear plot of log (x/m)`vervus log Pin a Freundlich adsorption isotherm, which of the following statemente is correct (K and mare constant)

A. both k and $\frac{1}{n}$ appear in the slope term

B. $\frac{1}{n}$ appears as the intercept

C. only $\frac{1}{n}$ appear as the slope

D. log $\left(\frac{1}{n}\right)$ appear as the intercept

Answer:

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8. The Tyndall effect is observed only when the conditions are satisfied

(i) the diameter of dispersed particle is much smaller than the

wavelength of the light used

(ii) the diameter of the dispersed particle is not much smaller than the wavelength of the light used

(iii) the refractive indices of the dispersed phase and the dispersion medium are almost similar in magnitude

(iv) the refractive indices of the dispersed phase and the dispersion medium differ greatly in magnitude

A. (i) and (iii)

B. (ii) and (iii)

C. (i) and (iv)

D. (ii) and (iv)

Answer:

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

A. A critical miscelle concentration

B. oxidation number

C. coagulation value

D. gold number

Answer:

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10. Which is incorrect about enzyme catalysis

A. enzymes are denaturated by ultraviolet rays and by applying high temperature

B. enzymes are least reactive at optimum temperature

C. enzymes are mostly proteinous in nature

D. enzyme action is specific

Answer:

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11. In Freundlich adsorption isotherm, the value of $\frac{1}{n}$ is -

A. 1 in case of physical adsorption

B. 1 in case of chemisorption

C. between 0 and 1 in all cases

D. between 2 and 4 in all cases.

Answer:

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12. Which of the folloowing statements is correct for the spontaneous adsorption of a gΔS-

A. ΔS is negative and , so, ΔH should be highly positive

B. ΔS is negative and, so, ΔH should be highly negative

C. ΔS is positive and, so, ΔH should be negative

D. ΔS is positive so ΔH should also be highly positive

Answer:

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13. Which property of colloids is not dependent on the charge on colloidal particles

A. coagulation

B. Electrophoresis

C. electro-osmosis

D. Tyndall effect

Answer:

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14. Which one of the following characteristics is ΔSsociated with adsorption

A. ΔG and ΔH are negative but ΔS is positive

B. ΔG and ΔS are negative but ΔH is positive

C. ΔG is negative but ΔH and ΔS are positive

D. ΔG, ΔH and ΔS all are negative

Answer:

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15. Fog is a colloidal solution of

A. solid in gas

B. gas in gas

C. liquid in gas

D. gas in liquid

Answer:

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16. The decomposition of phosphine (PH_3) an tungsten at low pressure is a first-order reaction. It is because the

A. rate of decomposition is very slow

B. rate is proportional to the surface coverage

C. rate is inversely proportional to the surface coverage

D. rate is independent of the surface coverage

Answer:

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17. The coagulation values in millimoles per litre of the electrolytes 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:

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18. Which one of the following statements is not correct -

A. the value of equilibrium constant is changed in presence of a catalyst in the reaction of equilibrium

B. enzymes increase the catalytic biochemical reactions

C. coenzymes increase the catalytic activity of enzyme

D. catalyst does not initiate any reaction.

Answer:

Watch Video Solution

19. On which of the following properties does the coagulating power of Ion depend-

A. the magnitude of the charge on the ion alone

B. size of the ion alone

C. both magnitude and sign of the charge on the ion

D. the sign of charge on the ion alone

Answer:

View Text Solution

20. Which of the following is incorrect for physisorption -

A. reversible

B. increases with increase in temperature

C. low heat of adsorption

D. increase with increase in surface area

Answer:

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21. A colloidal solution is kept in dark and is illuminated by a beam of light. Brightness appears at the right angle of direction of light. This effect is called

A. Tyndall effect

B. Browlian effect

C. Hardy-Schulze effect

D. none of these

Answer:

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22. Accroding to Hardy-Schulze law, the flocculating power of an ion increases with

A. decrease in size

B. increases in size

C. decrease in charge

D. increase in charge

Answer:

Watch Video Solution

23. Hair cream is a/an

A. gel

B. emulsion

C. solid sol

D. sol

Answer:

Watch Video Solution

24. Which one of the following is an example of homogenous catalysis -

A. manufacturing of ammonia by Haber's process

B. manufacture of sulphuric acid by contact process

C. hydrogenation of oil

D. hydrolysis of sucrose in presence of dilute hydrochloric acid .

Answer:

Watch Video Solution

25. Purification of colloidal is done by -

A. dialysis

B. peptisation

C. electrophoresis

D. coagulation

Answer:

Watch Video Solution

26. A colloidal solution is kept in dark and is illuminated by a beam of light. Brightness appears at the right angle of direction of light . This effect is called.

A. Tyndall effect

B. Browlian effect

C. Hardy-Schulze effect

D. none of these

Answer:

Watch Video Solution

27. Paints and hair creams are respectively -

A. sol and emulsion

B. aerosol and foam

C. emulsion and sol

D. foam and gel

Answer:

Watch Video Solution

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

A. 100

B. 36.5

C. 0.365

D. 150

Answer:

Watch Video Solution

29. Which of the followign statements is incorrect -

A. on prolonged dislysis colloid becomes stable

B. $AgNO_3$ in excess KI forms negative colloid

C. $AgNO_3$, in excess KI forms positive colloid

D. medicines work test in colloidal form because of greater surface area

Answer:

Watch Video Solution

Solved Necrt Exempler Problems

1. Which of the following process does not occur at the interface of phases-

A. crystallisation

B. heterogeneous catalysis

C. homogeneous catalysis

D. corrosion

Answer: C

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2. At the equilibrium, in the process of adsorbtion-

A. $\Delta H > 0$

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

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

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

Answer: B

Watch Video Solution

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 absorbtion and adsorption

D. desorption

Answer: C

Watch Video Solution

5. Extent of physisorption of a gas increases with -

A. increase in temperature

B. decrease in temperature

C. decrease in surface area of adsorbent

D. decrease in strength of van der Waals forces

Answer: B

Watch Video Solution

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. decrease in amount of adsorbate in solution

D.

Answer: A

Watch Video Solution

7. Which one of the following is not applicable to the phenomenon of absorption-

A. $\Delta H > 0$

B. $\Delta G < 0$

C. $\Delta H < 0$

D. $\Delta S < 0$

Answer: A

View Text Solution

8. Which of the following is not a favourable condition for physical adsorption-

A. high pressure

B. negative ΔH

C. higher critical temperature of adsorbate

D. high temperature

Answer: D

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

12. In which of the following reactions heterogeneous catalysis involved-

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

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

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

(d)

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

A. (b),(c)

B. (b),(c),(d)

C. (a),(b),(c)

D. (d)

Answer: A

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13. At high concentration of soap in water, soap behaves as-

A. molecular colloid

B. associated colloid

C. macromolecular colloid

D. lyophilic colloid

Answer: B

Watch Video Solution

14. Which of the following will show Tyndall effect-

A. aqueous solution of 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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15. 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

Watch Video Solution

16. Freshly prepared precipitate sometimes gets converted to colloidal solution by-

A. coagulation

B. electrolysis

C. diffusion

D. peptization

Answer: D

Watch Video Solution

17. Which of the following electrolytes will have maximum coagulating value for $Agl / Ag^{+} sol$-

A. Na_2S

B. Na_3PO_4

C. Na_2SO_4

D. NaCl

Answer: B

Watch Video Solution

18. 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

Watch Video Solution

19. Values of colligative properties of colloidal solution are of small order compared 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 lyophillic colloids

D. are comparatively less in number

Answer: D

Watch Video Solution

20. 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

Watch Video Solution

21. 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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22. Which of the following options are correct-

A. micelle formation by soap in aqueous solution is possible at all temperature

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

Watch Video Solution

23. Which of the following statements are correct about solid catalyst-

A. same reactants may give different product 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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24. Freundlich adsorption isotherm is given by the expression $x/m = kp^{1/n}$ which of the following conclusions can be drawn from this expression.

A. when $1/n = 0$, adsorption is independent of pressure

B. when $1/n = 0$, 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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25. 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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26. 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

Watch Video Solution

27. 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

Watch Video Solution

28. Which of the following substances will precipitate the negatively charged emulsions-

A. KCl

B. glucose

C. urea

D. NaCl

Answer: A::D

Watch Video Solution

29. 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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30. What happens when a lyophillic 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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31. 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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32. In a reaction, catalyst changes

A. physically

B. qualitatively

C. chemically

D. quantitatively

Answer: A::B

Watch Video Solution

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

Watch Video Solution

35. Why is chemisorption referred to as activate adsorption?

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

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

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38. How does it become possible to cause artificial in spraying silver iodide on the clouds?

Watch Video Solution

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

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40. What is collodion?

Watch Video Solution

41. Why do we add alum to purify water?

Watch Video Solution

42. What happens when electric field is applied to colloidal solution?

Watch Video Solution

43. What causes brownian motion in colloidal dispersion?

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44. 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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45. How do emulsifying agents stabilise the emulsion .

Watch Video Solution

46. Why do some medicines more effective in colloidal form ?

Watch Video Solution

47. Why does leather get hardened after tanning?

Watch Video Solution

48. How does the precipitation of colloidal smoke taken place in Cottrell precipitator?

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49. How will you distinguish between dispersed phase andn dispersion medium in an emulsion?

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50. On the basis of Hardy-Schulze rule explain why the coagulating power of phosphate is higher than chloride.

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51. Why does bleeding stop by rubbing moist alum?

Watch Video Solution

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

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53. Why do physisorption and chemisorption behave differently with rise in temperature?

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54. What happens when dialysis is prolonged?

Watch Video Solution

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

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

Watch Video Solution

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

Watch Video Solution

58. Give an example where physisorption changes to chemisorption with rise in temperature. Explain.

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

Watch Video Solution

60. What is the role of diffusion in heterogeneous catalysis?

Watch Video Solution

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

Watch Video Solution

62. Do the vital functions of the body such as digestion de affected during fever? Explain your answer.

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63. 

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64. 

View Text Solution

65. 

View Text Solution

66. 

View Text Solution

67. 

View Text Solution

68. 

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69. Assertion (A): Ordinary filter paper impregnated with colloidal solution stops the flow of particles.

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

A. (A) and (R) both are correct statements and (R) is correct explanation for (A)

B. (A) and (R) both are correct statements but (R) is not correct explanation for (A).

C. (A) is correct statement but (R) is wrong statement.

D. (A) and (R) both are incorrect statements.

Answer: C

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70. Assertion (A): Colloidal solutions show colligative properties.

Reason (R): Colloidal particles are large in size.

A. (A) and (R) both are correct statements and (R) is correct explanation for (A)

B. (A) and (R) both are correct statements but (R) is not correct explanation for (A).

C. (A) is correct statement but (R) is wrong statement.

D. (A) and (R) both are incorrect statements.

Answer: B

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71. Assertion (A): Colloidal solutions do not show brownian motion.

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

A. (A) and (R) both are correct statements and (R) is correct explanation for (A)

B. (A) and (R) both are correct statements but (R) is not correct explanation for (A).

C. (A) is correct statement but (R) is wrong statement.

D. (A) is wrong statement but (R) is correct statement

Answer: D

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

Reason (R): Greater the valency of the flocculating ion added, greater is its power to cause precipitation (Hardy Schulze rule).

A. (A) and (R) both are correct statements and (R) is correct explanation for (A)

B. (A) and (R) both are correct statements but (R) is not correct explanation for (A).

C. (A) is correct statement but (R) is wrong statement.

D. (A) and (R) both are incorrect statements.

Answer: A

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73. 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 concentration of detergents becomes equal to CMC.

A. (A) and (R) both are correct statements and (R) is correct explanation for (A)

B. (A) and (R) both are correct statements but (R) is not correct explanation for (A).

C. (A) is correct statement but (R) is wrong statement.

D. (A) and (R) both are incorrect statements.

Answer: A

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

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

Watch Video Solution

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

Watch Video Solution

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

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Mcq Hotspot

1. Which one of the following statements is not true about chemisorption-

A. it is irreversible in nature

B. it is independent of temperature

C. it has high activation energy

D. it is high specific in nature

Answer: B

2. Which one of the following statements is incorrect-

A. adsorbates can form single or multilayers on the surface of adsorbents

B. the adsorption of a gaseous reactant on a solid surface increases with increase in pressure of a gas

C. the adsorption of a gaseous reactant on a solid surface increases with rise in temperature

D. finely divided charcoal has a greater power of adsorption than granular charcoal

Answer: C

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3. Which one of the following is true for physisorption-

A. it increases with increase in temperature

B. in physisorption, the entropy of the system increases

C. physisorption is non-spontaneous

D. it involves low heat of adsorption

Answer: D

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4. Which one of the following processes does not involve adsorption-

A. heterogeneous catalysis

B. homogeneous catalysis

C. froth-floatation

D. gas mask

Answer: C

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5. The critical temperatures of H_2, CH_4, NH_3 and CO_2 are in the order $H_2 < CH_4 < CO_2 < NH_3$. Which one of the following gets adsorbed to a maximum extent, on 1 g of activated charcoal, at a specific temperature-

A. NH_3

B. H_2

C. CH_4

D. CO_2

Answer: A

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6. m'g of activated charcoal is added to an aqueous solution of acetic acid. If x mol of acetic acid gets adsorbed on charcoal at equilibrium , and if concentration of the solution is 'C', then according to Freundlich's adsorption isotherm-

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

B. $\frac{m}{x} = KC$

C. $\frac{x}{m} = kC^{\frac{1}{2}}$

D. $\frac{x}{c} = KC^{\frac{1}{2}}$

Answer: C

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7. In the manufacture of sugar, activated charcoal is used to decolourise the raw cane sugar because-

A. molecules of sugar get adsorbed on activated charcoal

B. molecules of sugar react with activated charcoal

C. activated charcoal adsorbs the colouring matter

D. activated charcoal reacts with the colouring matter

Answer: C

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8. The mechanism of a chemical reaction in the presence and absence of a catalyst-

A. remains the same, but in the presence of a catalyst, the energy of activation of a reaction is low

B. is different and in the presence of a catalyst, the energy of activation of the reaction is low

C. is different and in the absence of a catalyst, the energy of activation of a reaction is low

D. remains the same, but in the absence of a catalyst, the energy of activation of the reaction is low

Answer: B

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9. Adsorption of a gas on a solid surface is an exothermic process, because-

A. change in free energy of the system increases

B. enthalpy of the system increases

C. entropy of the system increase

D. enthalpy of the system decreases

Answer: D

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10. Which one of the following statements is not true with respect to physisorption-

A. multilayer of adsorbate molecules forms at high pressure

B. adsorption enthalpy is low and it is positive

C. it involves van der Waals' forces

D. easily liquifiable gases are readily adsorbed

Answer: B

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11. If the rate constants of a reaction at a specific temperature in presence and absence of a catalyst are given by K_1 and K_2 respectively , then-

A. $K_1 = K_2$

B. $K_1 > K_2$

C. $K_1 < K_2$

D. cannot be predicated

Answer: B

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12. For a reversible reaction in presence of a catalyst-

A. only the rate of forward reaction increases

B. only the rate of backward reaction increases

C. both the rate of forward and backward reactions increase to the same extent.

D. the rate of forward reaction is greater than the rate of backward reaction.

Answer: C

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13. If a reaction is carried out separately I absence and presence of a catalyst-

A. the change in free energy remains the same, whereas the change in enthalpy increases

B. the change in free energy increases, whereas the change in enthalpy remains the same

C. the change in free energy as well as the change in enthaply decreases

D. the change in free energy as well as the change in enthaply both remain the same

Answer: D

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14. Which of the following does not occur during adsorption of a gaseous reactant in presence of solid catalyst-

A. adsorption of the reactant molecules on the surface of the catalyst

B. desorption of the reactant molecules from the surface of the catalyst

C. desorption of the product molecules from the surface of the catalyst

D. diffusion of the product molecules from the surface of the catalyst

Answer: B

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15. The highest optimum temperature for enzymatic activity in human body is -

A. 298 K

B. 300 K

C. 310 K

D. 325 K

Answer: C

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16. Which one of the following statements is correct-

A. in homogeneous catalysis , the catalyst and the reactant always exist in the gaseous state

B. in heterogeneous catalysis, reactant molecules remain adsorbed on the surface of the catalyst by physisorption

C. in heterogeneous catalysis, reactant molecules should be strongly adsorbed on the surface of the adsorbent

D. in heterogeneous catalysis, the reactant molecules should not be too weakly adsorbed on the surface of the adsorbent

Answer: D

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17. Sucrose hydrolyses in presence of enzyme invertase, to give glucose and fructose. However, this reaction does not occur in presence of maltase , because-

A. in presence of maltase, the energy of activation of the reaction increases

B. reaction of sucrose with maltase forms stable complex

C. maltase changes the structure of sucrose

D. enzymatic activity is highly specific

Answer: D

View Text Solution

18. According to the Lock and Key model, the mechanism of an enzyme catalysed reaction (where E= enzyme , S = substrate , ES = enzyme -substrate activated complex and P = product) is -

A. $E + S \rightarrow ES, ES \rightarrow P$

B. $E + S \rightarrow ES, ES \Leftrightarrow P + E$

C. $E + S \Leftrightarrow ES, ES \rightarrow P + E$

D. $E + S \Leftrightarrow ES, ES \Leftrightarrow P + E$

Answer: C

Watch Video Solution

19. For which one of the following colloidal system, dispersed phase is liquid and dispersion medium is solid-

A. sol

B. gel

C. foam

D. cream

Answer: B

Watch Video Solution

20. Which does not have 'liquid' as its dispersion medium-

A. foam

B. sulphur sol

C. fog

D. cream

Answer: C

Watch Video Solution

21. Which one of the following substances form a colloidal solution in water-

A. glucose

B. urea

C. $BaSO_4$

D. starch

Answer: D

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22. A certain sol undergoes anaphoresis under the influence of an electric field. Which of the following is highly effective in the coagulation of this sol-

A. Na_3PO_4

B. $Al(NO_3)_3$

C. K_2SO_4

D. $CaCl_2$

Answer: B

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23. Out of the following metals, whose colloidal sol cannot be prepared by Bredig's are method-

A. Ag

B. Au

C. Fe

D. Pt

Answer: C

Watch Video Solution

24. Out of the following , whose hydrosol is hydrophobic-

A. starch

B. As_2S_3

C. gum

D. gelatin

Answer: B

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25. Butter is a colloid. It forms when-

A. the fat droplets are dispersed in water

B. the fat droplets are dispersed in casein

C. the water droplets are dispersed in fat

D. the casein droplets are dispersed in water

Answer: C

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26. The hydrosol of ferric hydroxide is -

A. lyophilic in nature

B. reversible in nature

C. protective colloid

D. exhibits cataphoresis in an electric field

Answer: D

Watch Video Solution

27. Which one of the following is most effective in the coagulation of ferric hydroxide sol-

A. SO_4^{2-}

B. Al^{3+}

C. PO_4^{3-}

D. Ca^{2+}

Answer: C

View Text Solution

28. On adding gelatine to arsenious sulphide sol-

A. arsenious sulphide sol gets coagulated

B. gelatin sol gets coagulated

C. the stability of arsenious sulphide sol increases

D. the stability of gelatin sol increases

Answer: C

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29. Macromolecular colloid is a -

A. starch sol

B. sulphur sol

C. gelatin sol

D. micelle

Answer: B

View Text Solution

30. Adding a solution of KI to a solution of $AgNO_3$ will form a negatively charged AgI sol if the number of moles of $AgNO_3$ compared to the number of moles of KI is -

A. greater

B. fewer

C. equal

D. all three

Answer: B

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31. The gold numbers of lyophilic colloids A, B ,C and D are 125, 10, 0.1 and 0.005 respectively. Their protective power will be in the order-

A. $B > D > C > A$

B. $D > C > B > A$

C. $A > B > C > D$

D. $C > B > A > D$

Answer: B

View Text Solution

32. If the osmotic pressure of a true solution and a colloidal solution of a substance are $\pi_1 \& \pi_2$ respectively, then-

A. $\pi_1 = \pi_2$

B. $\pi_1 < \pi_2$

C. $\pi_1 > \pi_2$

D. cannot be predicated

Answer: C

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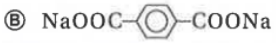
33. Which one of the following can form an anionic micelle in water-

A. pyridinium chloride

B. 

C. dodecyltrimethyl ammonium chloride

D. sodium dodecyl sulphate

Answer: D

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34. Which on of the following processes are applied in Cottrell precipitator-

A. electro-osmosis

B. dialysis

C. electrophoresis

D. electrodialysis

Answer: C

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35. Adding a few drops of dilute $FeCl_3$ solution to a freshly precipitated $Fe(OH)_3$ sol gives a red colloidal solution . This phenomenon is known as-

A. dialysis

B. coagulation

C. protection

D. peptisation

Answer: D

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36. Which of the following characteristics of sol particles is responsible for the stability of a hydrophobic sol-

A. Brownian movement and greater surface area

B. charge and greater surface area

C. Brownian movement and charge

D. Brownian movement and Tyndall effect

Answer: C

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37. When 1 mL of 10% NaCl solution is added to 10 mL gold sol in presence of x g lyophilic colloid, coagulation is inhibited . The gold number of the colloid is -

A. x

B. 10x

C. 100x

D. 1000x

Answer: D

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38. Which one of the following is most effective in coagulating Sb_2S_3 sol?0

A. Na_2SO_4

B. $CaCl_2$

C. $Al_2(SO_4)_3$

D. NH_4Cl

Answer: C

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39. Which one of the folllowing will form micelle at a minimum concentration-

A. $CH_3(CH_2)_{15}N^+(CH_3)_3Br^-$

B. $CH_3(CH_2)_{11}OSO_3^- Na^+$

C. $CH_3(CH_2)_6COO^- Na^+$

D. $CH_3(CH_2)_{11}N^+(CH_3)Br^-$

Answer: A

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40. Which of the following statements about chemical adsorption are incorrect-

A. it is a universal process

B. this process has a high value of activation energy

C. extent of this process increases at low temperatures

D. the process is exothermic

Answer: A::C

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41. Which of the following statements about physical adsorption are correct-

A. this type of adsorption lacks specificity

B. extent of this process increases at high temperatures

C. in this type of adsorption , the heat of adsorption is low

D. it is an irreversible adsorption

Answer: A::C

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42. A reaction is separately carried out in absence and presnce of a catalyst . If the activation energies in presnce and absence of

catalyst are E_a and E'_a respectively and the reaction-enthalpies are $\Delta H'$ respectively , then-

A. $E_a < E'_a$

B. $E_a = E'_a$

C. $\Delta H = \Delta H'$

D. $\Delta H < \Delta H'$

Answer: A::C

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43. Which of the following substances have the same dispersion phase-

A. smoke

B. milk

C. foam

D. fog

Answer: A::D

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44. Sol particles of ferric hydroxide (I) and arsenlous sulphate (II) are positively and negatively charged respectively . Which of the following are correct-

A. coagulation will take place when sol (II) compared to sol (II)

B. Na_2SO_4 solution will quickly coagulate sol (I) compared to sol (II)

C. particles of sol (I) will exhibit anaphoresis and that of sol (II) will exhibit cataphoresis

D. sol (I) is reversible and sol (II) is irreversible

Answer: A::B

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45. Which of the following compounds are form micelle-

A. pyridinium chloride

B. sodium oleate

C. sucrose

D. cetytrimethylammonium

Answer: B::D

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46. Which of the following statements given below are true about gold-sols

A. the dispersed phase of gold sol is used

B. the dispersion of gold sol is solid

C. it is a lyophobic colloid

D. it is a lyophilic colloid

Answer: A::C

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47. Which of the following pairs are correctly presented -

A. butter-gel

B. milk-emulsion

C. fog-aerosol

D. dust-solid sol

Answer: B::C

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48. Which of the following are multimolecular colloids-

A. sulphur sol

B. protein sol

C. gold sol

D. an aqueous solution of soap

Answer: A::C

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49. Which of the following de form macromolecular colloids

A. starch

B. albumin

C. detergent

D. cellulose

Answer: A::B::D

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50. Which of the following statement are true-

A. physisorption is universal in nature and it involves formation of multimolecular layer on the surface of adsorbent

B. rate of a chemisorption increases with rise in temperature

C. there are some cases, where molecules of solvent instead os solute molecules , get adsorbed on the surface of the adsorbent

D. surface free energy increases due to adsorption

Answer: A::C

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Exercise

1. Under similar experimental conditions, which out of CO_2 and N_2 gets adsorbed on finely divided charcoal to a greater extent?

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2. Why is heat of chemisorption greater than that of physisorption?

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3. What is a homogeneous catalysis? Give example.

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4. What is a heterogeneous catalysis? Give example.

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5. What do you mean by enzyme catalysis? Give an example.

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6. You are given a sample of a true solution and a colloidal solution having the same colour. How will you identify them?

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7. What happens when gelatin is added to a silver sol?

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8. What type of sol is obtained when H_2S gas is passed over an aqueous solution is SO_2 ?

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9. An oil-soluble dye is added to an emulsion. As a result, a coloured liquid drop is produced within the emulsion. State,

whether the emulsion is oil-in-water or water-in-oil?

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10. If electrical conductivity of an emulsion increases with the addition of NaCl, identify the type of emulsion that is formed.

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11. When a few drops of dil. HCl is added to a freshly prepared $Fe(OH)_3$ solution, a red colloidal solution is produced. What do you call this phenomenon?

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12. Which is a hydrophobic sol-gum, gelatin, sulphur?

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13. The surface tension of a sol is equal to that of the dispersion medium. What type of sol is this? Give an example.

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14. Which of the following will be needed in least amount for the coagulation of As_2S_3 sol?

K_2SO_4, $Al(NO_3)_3$, $Mg(NO_3)_2$

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15. Which one is a cationic surface-active agent?

(i) dodecyl trimethylammonium chloride

(ii) sodium dodecyl sulphate

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16. Mention the experiment that shows that colloidal particles are electrically charged.

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17. In what respect does a hydrosol resemble a solid aerosol ?

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18. What kind of colloid is obtained in case of soap-like substance ?

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19. What happens when a lyophobic colloid electrophoresis for a prolonged time?

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20. What are quantum dot and nano-tube?

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21. Heat of chemisorption _____ is than heat of physisorption.

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22. Extent of adsorption in case of finely divided charcoal is _____than a piece of charcoal having the same weight.

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23. In heterogeneous catalysis, the reactant molecules occupy _____sites on the surface of the adsorbent.

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24. In colloidal solution, the diameter of the particles of the dispersed phase is _____Å and that of the particles of the dispersion medium is_____Å

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25. The temperature at which the activity of an enzyme catalyst is maximum is known as _____

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26. In adsorption , the changes in entropy of the system is _____ and the change in enthalpy is _____

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27. _____ adsorption forms unimolecular layer and _____ adsorption forms multimolecular layer.

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28. Quaternary ammonium salt is a _____ surfactant.

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29. Cod liver oil is a _____ type of emulsion.

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30. In aerosol, _____ is dispersed in _____.

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31. In the precipitate of AgCl, addition of Cl^- ions converts it to a colloidal solution. Here Cl^- fons act as _____

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32. If the concentration of a soap solution is increased, above _____ concentration,_____ is formed.

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33. The surface tension of a lyophilic colloid is _____than that of lyophobic colloid.

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34. In the coagulation of $Fe(OH)_3$, K_2SO_4 is _____ effective than $K_3\left[Fe(CN)_6\right]$.

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35. What do you mean by, the gold number of starch is 20-25?

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36. Generally, entropy is highly reduced by adsorption and the process is exothermic. Explain.

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37. What happens when a small amount of $Fe(OH)_3$ solution is added to a freshly prepared $FeCl_3$ sol?

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38. Why are the colloidal particles unable to settle down?

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39. The gold numbers of three lyophobic colloids A, B and C are 0.005, 0.05 and 0.5 respectively. Which one of these will behave as

the most effective protective colloid? Why?

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40. Explain the effect of temperature in the adsorption of a gas by a solid adsorbent.

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41. Explain heterogeneous catalysis in view of adsorption theory.

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42. The colloidal particles display Brownian movement but the particles of the suspension do not-explain.

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43. How do we know the charge of a sol particle?

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44. In the coagulation of As_2S_3 sol, $AlCl_3$ is more effective than NaCl. But in case of $Fe(OH)_3$ sol, Na_2SO_4 is more effective than NaCl. Explain.

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45. What happens when a colloidal sol undergoes dialysis for a prolonged time?

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46. What happens when an emulsion is centrifuged?

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47. What is isoelectric point? Isoelectric point of a protein is 6.0. If the pH of the protein sol is 8, then towards which electrode will the protein particles move during the process of electrophoresis?

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48. How would you express the protective power of a colloid?

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Practice Set 5

1. The process by which alum purifies turbid water is

A. absorption

B. adsorption

C. coagulation

D. dispersion

Answer:

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2. For adsorption, at equilibrium

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. The effective coagulating agent of Sb_2S_3 sol is -

A. $CaCl_2$

B. Na_2SO_4

C. NH_4Cl

D. $Al_2(SO_4)_3$

Answer:

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4. Which does not have 'liquid' as its dispersion medium-

A. foam

B. sulphur sol

C. fog

D. cream

Answer:

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5. What is peptisation ?

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6. What are the dispersed and dispersion medium of cake ?

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7. Which enzyme converts milk into curd ?

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8. What will be the sign of entropy change during adsorption ?

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9. How is the separation of inert gases possible by adsorption ?

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10. What do you mean by heterogeneous catalysis? Given an example of it.

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11. What is associated colloid? How does it form micelle?

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12. What is Tyndall effect? Write two conditions for Tyndall effect.

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13. Why does sky appear blue?

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