

# ANSWERS

## I. Multiple Choice Questions (Type-I)

- |          |          |          |           |           |          |
|----------|----------|----------|-----------|-----------|----------|
| 1. (iii) | 2. (ii)  | 3. (iv)  | 4. (iii)  | 5. (ii)   | 6. (i)   |
| 7. (i)   | 8. (iv)  | 9. (ii)  | 10. (i)   | 11. (ii)  | 12. (iv) |
| 13. (i)  | 14. (ii) | 15. (ii) | 16. (iii) | 17. (iv)  | 18. (ii) |
| 19. (iv) | 20. (iv) | 21. (ii) | 22. (iii) | 23. (iii) | 24. (iv) |
| 25. (ii) |          |          |           |           |          |

## II. Multiple Choice Questions (Type-II)

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|-----------------|-----------------|----------------|-----------------|
| 26. (ii), (iii) | 27. (i), (ii)   | 28. (i), (iii) | 29. (ii), (iii) |
| 30. (ii), (iv)  | 31. (ii), (iv)  | 32. (i), (iv)  | 33. (iii), (iv) |
| 34. (i), (iii)  | 35. (ii), (iii) | 36. (i), (ii)  | 37. (i), (iv)   |

## III. Short Answer Type

- It is important to have clean surface as it facilitates the adsorption of desired species.
- Chemisorption involves formation of bond between gaseous molecules/atoms and the solid surface for which high activation energy is required. Thus it is referred to as activated adsorption.
- At lower concentration soap forms a normal electrolytic solution with water. After a certain concentration called critical micelle concentration, colloidal solution is formed.
- Gold sol is a lyophobic sol. Addition of gelatin stabilises the sol.
- Clouds are colloidal in nature and carry charge. Spray of silver iodide, an electrolyte, results in coagulation leading to rain.
- Icecreams are emulsions which get stabilised by emulsifying agents like gelatin.
- It is a 4% solution of nitrocellulose in a mixture of alcohol and ether.
- The colloidal impurities present in water get coagulated by added alum, thus making water potable.
- The charged colloidal particles start moving towards oppositely charged electrodes.
- Unbalanced bombardment of the particles of dispersed phase by molecules of dispersion medium causes brownian motion. This stabilises the sol.
- Positively charged sol of hydrated ferric oxide is formed and on adding excess of NaCl, negatively charged chloride ions coagulate the positively charged sol of hydrated ferric oxide.

49. The emulsifying agent forms an interfacial layer between suspended particles and the dispersion medium thereby stabilising the emulsion.
50. Medicines are more effective in the colloidal form because of large surface area and are easily assimilated in this form.
51. Animal hide is colloidal in nature and has positively charged particles. When it is soaked in tanin which has negatively charged colloidal particles, it results in mutual coagulation taking place.
52. In Cottrell precipitator, charged smoke particles are passed through a chamber containing plates with charge opposite to the smoke particles. Smoke particles lose their charge on the plates and get precipitated.
53. On adding dispersion medium, emulsions can be diluted to any extent. The dispersed phase forms a separate layer if added in excess.
54. Minimum quantity of an electrolyte required to cause precipitation of a sol is called its coagulating value. Greater the charge on flocculating ion and smaller is the amount of electrolyte required for precipitation, higher is the coagulating power of coagulating ion (Hardy-Schulze rule).
55. Moist alum coagulates the blood and so formed blood clot stops bleeding.
56. The adsorption of positively charged  $\text{Fe}^{3+}$  ions by the sol of hydrated ferric oxide results in positively charged colloid.
57. Physisorption involves weak van der Waals forces which weaken with rise in temperature. The chemisorption involves formation of chemical bond involving activation energy and like any other chemical reaction is favoured by rise in temperature.
58. Due to excessive dialysis, traces of electrolyte which stabilises the colloids is removed completely, making the colloid unstable. As a result coagulation takes place.
59. Eosin is adsorbed on the surface of silver halide precipitate making it coloured.
60. Activated charcoal acts as an adsorbent for various poisonous gases present in the coal mines.
61. River water is a colloidal solution of clay and sea water contains lot of electrolytes. The point at which river and sea meet is the site for coagulation. Deposition of coagulated clay results in delta formation.
62. The process of physisorption for example that of  $\text{H}_2$  on finely divided nickel, involves weak van der Waals' forces. With increase in temperature, hydrogen molecules dissociate into hydrogen atoms which are held on the surface by chemisorption.
63. After the reaction is over between adsorbed reactants, the process of desorption is important to remove products and further create space for the other reactant molecules to approach the surface and react.
64. The gaseous molecules diffuse on to the surface of the solid catalyst and get adsorbed. After the required chemical changes the products diffuse away from the surface of the catalyst leaving the surface free for more reactant molecules to get adsorbed and undergo reaction.

65. When gaseous molecules come in contact with the surface of a solid catalyst, a weak chemical combination takes place between the surface of the catalyst and the gaseous molecules, which increases the concentration of reactants on the surface. Different molecules adsorbed side by side have better chance to react and form new molecules. This enhances the rate of reaction. Also, adsorption is an exothermic process. The heat released in the process of adsorption is utilised in enhancing the reaction rate.
66. **Hint :** The optimum temperature range for enzymatic activity is 298-310 K. On either side of this temperature range, enzymatic activity gets affected. Thus, during fever, when temperature rises above 310 K, the activity of enzymes may be affected.

#### IV. Matching Type

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|-----|-----------|------------|-------------|------------|
| 67. | (i) → (b) | (ii) → (c) | (iii) → (d) | (iv) → (a) |
| 68. | (i) → (c) | (ii) → (d) | (iii) → (b) | (iv) → (a) |
| 69. | (i) → (b) | (ii) → (c) | (iii) → (d) | (iv) → (a) |
| 70. | (i) → (b) | (ii) → (c) | (iii) → (d) | (iv) → (a) |
| 71. | (i) → (d) | (ii) → (c) | (iii) → (a) | (iv) → (b) |
| 72. | (i) → (d) | (ii) → (c) | (iii) → (a) | (iv) → (b) |

#### V. Assertion and Reason Type

73. (iii)      74. (ii)      75. (v)      76. (i)      77. (i)

#### VI. Long Answer Type

78. **Hint**
- reactants are adsorbed on the surface of the catalyst
  - occurrence of chemical reaction on the surface of catalyst
  - desorption.
79. **Hint:**
- In TLC
  - Adsorption indicators.
  - In qualitative analysis.
80. **Hint:**
- Adsorption of pine oil on sulphide ore particles.
  - Formation of emulsion.
  - Hence ore comes out with froth.
  - Explanation for shape selective catalysis.
81. **Hint:**
- Honey comb like structure of zeolites.
  - Pores provide sites for reactants to react.