

CHAPTER ASSESSMENT

Very Short Answer Type Questions [1 Mark]

- 1 Why is osmotic pressure considered as a colligative property?
- 2 What possible value of 'i' will it have, if solute molecules undergo association in solution?
- 3 A person suffering from high blood pressure should consume less common salt. Give reason.
- 4 What would be the value of van't Hoff factor for a dilute solution of Na_2SO_4 in water?
- 5 Give an example of solid solution in which the solute is a gas.
- 6 Why cannot we separate an azeotropic mixture by distillation?
- 7 A and B liquids on mixing produced a warm solution. Which type of deviation is this and why?
- 8 What is the sum of mole fractions of all the components in a three component system?

Short Answer Type I Questions [2 Marks]

- 9 What type of liquids form non-ideal solutions?
- 10 An electrolyte AB is 50% ionised in aqueous solution. Calculate the freezing point of 1 molal aqueous solution.
- 11 Which out of molality, molarity and mole fraction of a solution will remain unchanged and why?
- 12 Why constant boiling mixtures behave like a single component when subjected to distillation?
- 13 Write four differences between solutions having positive deviation and solutions having negative deviations from Raoult's law.
- 14 Explain why the boiling point of a solvent is increased on dissolving a non-volatile solute into it?
- 15 What is the advantage of using osmotic pressure as compared to other colligative properties for the determination of molar masses of solutes in solutions?

- 16 A solution prepared by dissolving 1.25 g of oil of winter green (methyl salicylate) in 99 g of benzene has a boiling point of 80.31°C and K_b for benzene is $2.53 \text{ K kg mol}^{-1}$. Find molar mass of the solute. Boiling point of benzene = 80°C .
[Ans. $152.11 \times 10^3 \text{ g mol}^{-1}$]
- 17 Calculate the molality of K_2CO_3 solution which is formed by dissolving 2.5 g of it in 1 L of solution. Density of solution is 0.85 g mL^{-1} .
- 18 A solution contains 25% water, 25% ethanol and 50% acetic acid by mass. Calculate the mole fraction of each component.

Short Answer Type II Questions [3 Marks]

- 19 Discuss biological and industrial importance of osmosis.
- 20 Calculate the freezing point depression expected for 0.0711 m aqueous solution of Na_2SO_4 . If this solution actually freezes at 0.320°C , what would be the value of van't Hoff factor? (K_f for water is $1.86^\circ\text{C mol}^{-1}$)
[Ans. 0.397°C , 2.42]
- 21 A 5% solution (by mass) of cane sugar in water has a freezing point of 271 K. Calculate the freezing point of 5% (by mass) solution of glucose in water. The freezing point of pure water is 273.15 K. (Molar mass of cane sugar = 342 g mol^{-1} and molar mass of glucose = 180 g mol^{-1})
[Ans. 269.065 K]
- 22 Explain with example the concept of minimum boiling azeotropes and maximum boiling azeotropes.
- 23 Write three differences between ideal and non-ideal solutions.
- 24 Explain, how the measurement of depression in freezing point can be used for the determination of molecular masses of non-volatile solutes?
- 25 (i) Why does the use of pressure cooker reduce cooking time?
(ii) How does van't Hoff factor helps in the determination of degree of association or dissociation of a solute in solution?

ELECTROCHEMISTRY

CHAPTER ASSESSMENT

Very Short Answer Type Questions [1 Mark]

- 1 In galvanic cell, what is the polarity of anode?
- 2 Write the Nernst equation to calculate the cell potential of $\text{Mg}(s) | \text{Mg}^{2+}(aq) || \text{Ag}^+ | \text{Ag}$.
- 3 Write the Nernst equation for single electrode potential.
- 4 What is the efficiency of a fuel cell? What is the use of a fuel cell?
- 5 Suggest a metal that can be used for cathodic protection of iron against rusting.
- 6 Write the relation between cell potential and equilibrium constant.
- 7 What are the products obtained at cathode and anode, when PbBr_2 is electrolysed?
- 8 Why a cell stops working after sometime?

Short Answer Type I Questions [2 Marks]

- 9 The conductivity of a 0.20 M solution of KCl at 298K is 0.0248 S cm^{-1} . Calculate its molar conductivity. [Ans. $124 \text{ S cm}^2 \text{ mol}^{-1}$]
- 10 Write the Nernst equation and emf of the following cell at 298K.
 $\text{Fe}(s) | \text{Fe}^{2+}(0.001 \text{ M}) || \text{H}^+(1 \text{ M}) | \text{H}_2(g)(1 \text{ bar}) | \text{Pt}$.
- 11 The potential for the cell below is found to be 0.25 V.
 $\text{Pt}(s) | \text{H}_2(g) | \text{H}^+(aq), 1 \text{ mol/L} || \text{Cu}^{2+}(aq, C \text{ mol/L}) | \text{Cu}(s)$ What is the value of C? [Ans. $C = 8.89 \times 10^{-4} \text{ mol}^{-1}$]
- 12 Discuss the product of electrolysis of molten NaCl.
- 13 A solution of MgSO_4 is electrolysed for 20 min with a current of 1.5 A. What mass of magnesium is deposited at the cathode?
- 14 (i) Why does zinc react with dilute sulphuric acid but copper does not?
(ii) Why it is not possible to measure the single electrode potential?

- 15 Calculate the cell emf and $\Delta_r G^\circ$ for the cell reaction at 25°C



$$[\text{Given, } E_{\text{Zn}^{2+}/\text{Zn}}^\circ = -0.763 \text{ V, } E_{\text{Cd}^{2+}/\text{Cd}}^\circ = -0.403 \text{ V}$$

$$1 \text{ F} = 96500 \text{ C mol}^{-1}, R = 8.314 \text{ JK}^{-1} \text{ mol}^{-1}]$$

$$[\text{Ans. } \Delta_r G = -69480 \text{ J mol}^{-1}]$$

- 16 The emf of a cell corresponding to the reaction, $\text{Zn}(s) + 2\text{H}^+(aq) \longrightarrow \text{Zn}^{2+}(0.1 \text{ M}) + \text{H}_2(g, 1 \text{ atm})$ is 0.28 V at 25°C .

Write the half-cell reaction and calculate the pH of the solution at the hydrogen electrode.

$$E_{\text{Zn}^{2+}/\text{Zn}}^\circ = -0.76 \text{ V, } E_{\text{H}^+/\text{H}_2}^\circ = 0 \quad [\text{Ans. pH} = 8.6]$$

- 17 Find the equilibrium constant for the reaction,



$$\text{Given that, } E_{\text{Cu}^{2+}/\text{Cu}^+} = 0.15 \text{ V,}$$

$$E_{\text{In}^{2+}/\text{In}^+} = -0.4 \text{ V, } E_{\text{In}^{3+}/\text{In}^{2+}} = 0.42 \text{ V} \quad [\text{Ans. } K = 10^{10}]$$

- 18 A current of 3.7 A is passed for 6 h between nickel electrodes in 0.5 L of a 20 M solution of $\text{Ni}(\text{NO}_3)_2$. What will be the molarity of solution at the end of electrolysis? [Ans. 1.172 M]

Short Answer Type II Questions [3 Marks]

- 19 Calculate the standard cell potentials at 25°C for the electrochemical cells, $\text{Zn} | \text{Zn}^{2+} ||$ reference half-cell and reference half-cell $|| \text{Cu}^{2+} | \text{Cu}$, where the reference half-cell is,
(i) SHE
(ii) Ag/AgCl electrode.
[Ans. (i) 0.76 V, 0.34 V (ii) 0.98 V, 0.12 V]
- 20 Calculate the standard electrode potential of $\text{Ni}^{2+} | \text{Ni}$ electrode if emf of the cell, $\text{Ni}(s) | \text{Ni}^{2+}(0.01 \text{ M}) || \text{Cu}^{2+}(0.1 \text{ M}) | \text{Cu}(s)$ is 0.059 V.
[Given, $E_{\text{Cu}^{2+}/\text{Cu}}^\circ = +0.34 \text{ V}$] [Ans. 0.31 V]
- 21 Which cell is generally used in hearing aids? Name the material of the anode, cathode and electrolyte. Write the reactions involved.

CHEMISTRY IN EVERY DAY LIFE

CHAPTER ASSESSMENT

Very Short Answer Type Questions [1 Mark]

- 1 What role do chemical messengers play during drug-target interaction?
- 2 How do tagamet and zantac act as antacids?
- 3 Which class of drugs are used as hypnotics?
- 4 How does aspirin act as an analgesic?
- 5 What type of drug is chloramphenicol?
- 6 Why does use of saccharin is of great value to diabetic patients?
- 7 Why do chemicals added to food?

Short Answer Type I Questions [2 Marks]

- 8 Why does brompheniramine and terfenadine not affect the secretion of acid in stomach?
- 9 Name a neurotransmitter that is responsible for mood change. How does it causes depression?
- 10 How does the antibiotic arsphenamine similar to azo dye?
- 11 Is soap chips and soap granules the same thing?
- 12 Soaps dissolved in hard water causes hinderance to good washing. Give reason.
- 13 How are anionic detergents prepared? Why these are called anionic detergents?

Short Answer Type II Questions [3 Marks]

- 14 (i) "A large number of different receptors in the body interact with different chemical messengers," Explain.
(ii) What are antagonists and where are they required?
- 15 (i) Name a potent vasodilator present in human body.
(ii) How do neurologically active drugs work?

16 Mention one use for each of the following drugs:

- (i) Veronal
- (ii) Codeine
- (iii) Iproniazid

17 (i) What type of drugs are used to control microbial diseases and how?

(ii) Name two antipyretic drugs.

18 To which class of drugs sulphapyridine belongs? Give two examples of such drugs.

19 (i) Name a place in India, where penicillin is manufactured.

(ii) How do proteins of enzymes provide active sites?

20 (i) Why non-biodegradable detergents are considered to be environment unfriendly?

(ii) Morphine narcotics are called opiates. Give reason.

21 Give the chemical reactions involved in the formation of

(i) sodium lauryl sulphate.

(ii) non-ionic detergents.

22 (i) How does chlorine act as disinfectant?

(ii) What are competitive inhibitors?

23 Describe the interaction between drug and enzyme.

24 (i) With the help of an example explain how do tranquilizers act as antidepressants?

(ii) Why is rosin added to soaps?

25 (i) What is the difference between the term drug and medicine?

(ii) What are the consequences of using non-biodegradable detergents?