

B.Sc. DEGREE (C.B.C.S.S.) EXAMINATION, MARCH 2015**Sixth Semester****Core Course—SOLUTION CHEMISTRY—I**

[Common for B.Sc. Chemistry Model – I, Model – II and B.Sc. Petrochemicals and B.Sc. Chemistry Environment and Water Management]

Time : Three Hours

Maximum Weight : 25

Section A*Answer all questions.**Each bunch of four questions carries a weight of 1.*

- I. 1 Binary mixtures of *n*-hexane and *n*-heptane obey _____ law over the entire range of concentration.
- 2 According to Lewis concept an acid is a _____.
- 3 Reciprocal of resistance is called _____.
- 4 The relation between Electrical energy and Enthalpy of cell reaction is _____.
- II. 5 Combination of the two half-cells would result in a cell with the _____ EMF.
- 6 The speed of an ion varies with the potential applied. The term used for this is _____.
- 7 The buffer index β is defined as _____.
- 8 Henry's law is _____.
- III. 9 Define CST.
- 10 What is pH ?
- 11 Debye-Huckel limiting law equation is _____.
- 12 _____ is an example for oxidation reduction indicator used in volumetric analysis.
- IV. State whether the following statements are True or False :
- 13 In osmosis solvent molecules flow from high concentrated solution to less concentrated solution.
- 14 An aqueous solution of FeCl_3 is basic.
- 15 Specific conductance is the product of conductance and resistance.
- 16 Normal hydrogen electrode also referred to as standard electrode.

(4 × 1 = 4)

Turn over

Section B

*Answer any five questions.
Each question carries a weight of 1.*

- 17 What is meant by reverse osmosis ?
- 18 Show that for an ideal solution $\Delta V_{\text{mix}} = 0$.
- 19 What is a buffer solution ? Give one example.
- 20 Give the application of solubility product principle.
- 21 Explain the term transport number.
- 22 How would you estimate KOH using standard oxalic acid solution conductometrically ?
- 23 What is a Calomel electrode ? Give the electrode reactance.
- 24 What is meant by standard electrode potential?

(5 × 1 = 5)

Section C

*Answer any four questions.
Each question carries a weight of 2.*

- 25 Write a note on potentiometric titration.
- 26 Calculate the emf at 25° C. of the cell $\text{Zn(s)} | \text{Zn}^{2+}(0.1 \text{ M}) || \text{Ag}^{+}(0.1 \text{ M}) | \text{Ag(s)}$.
Given $E^{\circ} \text{Zn}^{2+}/\text{Zn} = -0.76 \text{ V}$; $E^{\circ} \text{Ag}^{+}/\text{Ag} = 0.80 \text{ V}$.
- 27 Describe how conductivity measurements may be used to determine the solubility of a sparingly soluble salt in water.
- 28 The molar conductances at infinite dilution for NH_4Cl , NaOH and NaCl are 129.8, 217.4 and 108.9 $\text{ohm}^{-1} \text{ cm}^2 \text{ eq}^{-1}$ respectively at 29 K. The electrolytic conductivity of a 0.01 M solution of NH_4OH at 291 K is $9.33 \times 10^{-5} \text{ ohm}^{-1} \text{ cm}^{-1}$. Calculate the degree of dissociation of NH_4OH at this dilution.
- 29 Explain Pearson's HSAB concept with suitable example.
- 30 State Raoult's law of relative lowering of vapour pressure. Show how the law can be utilized in determining the molar mass of solution.

(4 × 2 = 8)

Section D

*Answer any two questions.
Each question carries a weight of 4.*

- 31 What are ideal and non-ideal solutions ? Discuss briefly the deviation of real solution from their ideal between.

- 32 What is meant by the term transport number ? Explain the Hittorf's method of determining transport number.
- 33 Write note on :
- (a) Over voltage.
 - (b) Fuel cells.

(2 × 4 = 8)