E 1666　　　　　　　(Pages : 3)　　　　　Reg. No...............................

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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 Electical 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.

　　　　　　　　　　　　　　　　　　　　　　　　$(4 \times 1 = 4)$

　　　　　　　　　　　　　　　　　　　　　　　　Turn over

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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 $\Delta V_{mix} = 0$.

19 What is a buffer solution ? Give one example.

20 Give the appliation 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 reactace.

24 What is meant by standard electrode potential?

$(5 \times 1 = 5)$

Section C

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

25 Write a note on potentiometeric titration.

26 Calculate the emf at 25° C. of the cell Zn(s)|Zn^{2+}(0.1 M)||Ag$^+$(0.1 M)|Ag(s).
Given E°Zn^{2+}/Zn = – 0.76 V; E° Ag$^+$/Ag = 0.80 V.

27 Describe how conductivity measurements may be used to determine the solubility of a spraingly soluble salt in water.

28 The molar conductances at infinite dilution for NH$_4$Cl, NaOH and NaCl are 129.8, 217.4 and 108.9 ohm.$^{-1}$ cm.^{2} eq.$^{-1}$ respectively at 29 K. The electrolytic conductivity of a 0.01 M solution of NH$_4$OH at 291 K is 9.33×10^{-5} ohm.$^{-1}$ cm.$^{-1}$ Calculate the degree of dissociation of NH$_4$ OH 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.

$(4 \times 2 = 8)$

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.

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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.

$(2 \times 4 = 8)$