E 7488 (Pages : 3) Reg. No.....

Name.....

B.Sc. DEGREE (C.B.C.S.S.) EXAMINATION, MARCH 2014

Sixth Semester

Core Course—SOLUTION CHEMISTRY

(Common for B.Sc. Chemistry Model I, Model II and B.Sc. Petrochemicals and B.Sc. Chemistry—Environment and Water Managmenet)

Time : Three Hours Maximum Weight : 25

Section A

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

I. 1 A solution of two *or* more constituents is said to be ideal 17 it obeys ——— law.

2 Hydrogen chloride solution benzene is ———.

3 Mathematical representation of first law of Faraday is ———.

4 The effect of electrolyte concentration on electrode potential and e.m.f. if explained by ——— equation.

II. 5 The two half cell reactions in the Daniel cell are ———.

6 The transport number of an ion does not depend upon the ——— alone.

7 An example for acidic buffer is ———.

8 Colligative properties depends on ———.

III. 9 Mention *one* use of reverse osmosis.

10 State Ostwald's dilution law.

11 Hydrated ferric oxide is usually called ———.

12 Molar conductance ——— on progressive dilution.

IV. State whether the following statements are True *or* False :

13 Osmotic pressure of a solution does not depend upon the solute particles.

14 An aqueous solutions of $CuSO_4$ is basic.

Turn over

15 Degree of dissociation of weak electrolyte can be calculates using Kohlrausch's Law.

16 Hg, Hg_2Cl_2 (s) | KCl (aq) is not a reference electrode.

(4 × 1 = 4)

Section B

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

17 Cesium chloride is more soluble in water than LiCl explain. Why ?

18 Show that for an ideal solution $\Delta H_{mix} = 0$.

19 Write down Henderson equation. Explain the symbols.

20 Define hard and soft acids with suitable example.

21 How do the molar conductance of strong and weak electrolytes vary with dilution ?

22 Sketch the general shapes of the conductometric titration curves for the following :—

(a) Strong acid V_s strong base.

(b) Weak acid V_s weak base.

23 Define single electrode potential. Can its absolute value be determined ?

24 What is meant by reference electrode ? Give *one* example.

(5 × 1 = 5)

Section C

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

25 Write briefly on oxidation reduction indicators.

26 Calculate the E.M.F. at 298 K of the cell $Mg(s)|Mg^{2+}(0.1\ m)\|Ag^{+}(0.0001\ in)|Ag(s)$. Given $E°Ag^{+}/Ag = 0.80$ V ; $E°Mg^{2+}/Mg = -2.37$ V.

27 State and explain Kohlrausch's Law and give one of its application.

28 The resistance of 0.05 N sodium chloride solution in a conductivity cell is found to be 203 ohms. at 18°C. The cell constant of the cell is 0.9715 cm^{-1}. Calculate the equivalent conductance of the solution.

29 Explain how reverse osmosis is applied in desalination of seawater.

30 Explain the theory of acid-base indicators.

(4 × 2 = 8)

Section D

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

31 What is meant by corrosion of metals ? How is it monitored and what are the prevention method used ? Explain.

32 What is meant by transport number ? How is it determined by moving boundary method.

33 (a) Explain the term colligative properties with suitable example.

(b) Describe the principle of determining molar masses of non-volatile solutes from boiling point elevation measurements of their dilute solution.

(2 × 4 = 8)