E 1528 (Pages : 3) Reg. No.....

Name.....

B.Sc. DEGREE (C.B.C.S.S.) EXAMINATION, MARCH 2016

Sixth Semester

Core Course—SOLUTION CHEMISTRY—I

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

(2013 Admissions)

Time : Three Hours Maximum Marks : 60

Section A

Answer **all** *questions.*
Each question carries 1 *mark.*

1. Isotonic solutions have same ————.
2. Enthalpy change of missing for an ideal solution, ΔH_{min} = ————.
3. The ionic product of water at 25° C is ————.
4. The pH of a solution is 4. Its $[H^+]$ is ————.
5. The unit of molar conductance is ————.
6. Define ionic mobility.
7. The electrode at which oxidation occurs is called ————.
8. The quin hydrone electrode is represented as ————.

(8 × 1 = 8)

Section B

Answer any **six** *questions.*
Each question carries 2 *marks.*

9. State Nernst distribution law.
10. What are colligative properties ? Which are they ?
11. Define an acid and a base according to the concept of Lowry and Bronsted.
12. Define Buffer capacity and Buffer Index.
13. What is Kohlrausch's law ? Give an application.
14. Discuss the moving boundary method for the determination of transport numbers.

Turn over

15. Specific conductance of a decinormal solution of KCl at 18° C is 1.12 s m^{-1}. The resistance of a conductivity cell containing the solution at 18° C was found to be 55 Ω. What is the cell constant ?

16. What is a Galvanic cell ? Write the overall chemical reaction taking place in a Daniell cell.

17. What is meant by electrochemical series ? Why does Zinc react with sulphuric acid to give H_2, but silver does not ?

18. Discuss any *two* corrosion prevention methods.

(6 × 2 = 12)

Section C

Answer any **four** *questions.*
Each question carries 4 *marks.*

19. The vapour pressures of pure CCl_4 (M_m = 154 g mol^{-1}) and $SnCl_4$ (M_m = 170 g mol^{-1}) at 25° C are 114.9 and 238.3 torr, respectively. Assuming ideal behaviour, calculate total vapour pressure of a solution containing 10 g of CCl_4 and 15 g of $SnCl_4$.

20. A solution of 0.100M acetic acid is found to be dissociated to the extent of 1.33 per cent at the room temperature. Calculate the dissociation constant of the acid at this temperature.

21. Define the term ionic mobility. Derive the relation between ionic mobility and molar ionic conductance.

22. How does asymmetry and electrophoretic effects affect the mobility of ions ?

23. Derive the Nernst equation for describing the effect of concentration of electrolyte on electrode potential.

24. What are fuel cells ? Describe the functioning of hydrogen–Oxygen fuel cell.

(4 × 4 = 16)

Section D

Answer any **two** *questions.*
Each question carries 12 *marks.*

25. Explain the terms osmosis and osmotic pressure. Derive Van't Hoff equation for the osmotic pressure of a dilute solution. How is this equation utilized for determining molar mass of a solute ?

26. What are acid-base indicators ? Illustrate the mechanism of their action taking suitable examples. What is meant by the usefull range of an indicator ?

27. What is the principle under lying conductometric titrations ? Discuss the titration curves obtained in the titration of :

    (i) A strong acid with a strong base.

    (ii) A strong acid with a weak base.

    (iii) A mixture of HCl and CH_3COOH with sodium hydroxide.

    (iv) Silver nitrate against Potassium Chloride.

28. What are concentration cells ? Derive expressions for the emf's of concentration cells. (i) With transference ; and (ii) Without transference.

(2 × 12 = 24)