Date: *SUBJECT: CHEMISTRY*

IIPUC
MOCK 1

Timings Allowed: 3 Hrs 15 min   *Total Marks: 70*

PART A

I Answer ALL the following   1 X 10 = 10

1. Define molarity.
2. What are isotonic solutions?
3. How much charge is required for the reduction of one mole of Cu^{2+} ions to Cu?
4. The rate equation for the reaction A +B→ C is R = $k[A]^{1/2} [B]^1$. What is the order of the reaction?
5. What are catalytic promoters?
6. Give the composition of copper matte.
7. Which is the noble gas that is not found in the atmosphere?
8. Name the product formed when ethyl alcohol reacts with PCl_5.
9. What is Tollen's reagent?
10. Name the storage polysaccharide present in plants.

PART B

II Answer any FIVE of the following   2 X 5 = 10

11. Give any four differences between Scottky and Frenkel defects.
12. Calculate ⋋ºm for $MgCl_2$. The limiting molar conductivity of Mg^{2+} and Cl^- ion are $106.0 Scm^2/mol$ and $76.3 Scm^2/mol$ respectively.
13. Write Arrhenius equation and explain the terms.
14. Give reason
    (i)Cerium exhibits +4 oxidation state.
    (ii) Among Zn^{2+} and Cu^{2+} which is colourless.
15. Explain Williamson's ether synthesis.
16. What is the action of bromine in ethanoic acid on anisole. Give equation.
17. What are food preservatives? Give an example.
18. What are transquilisers? Give example.

PART C

III Answer any FIVE of the following   3 X 5 =15

19. In the extraction of aluminium by electrolysis
    i) give the composition of electrolytic used
    (ii)overall cell reaction
    (iii) role of cryolyte.
20. Write the balanced chemical equation with conditions involved in the manufacture of HNO_3 by Ostwald's process.
21. (a) How is chlorine prepared in the lab using $KMnO_4$.?
    (b)Mention any 2 reasons for the anomalous behaviour of oxygen.
22. Complete the following reaction.
    (a) $H_2SO_4 + SO_3$ -----→
    (b) $PbS + 4O_3$ -------→ $PbSO_4$ + _____
    (c) $Cu + 2H_2SO_4$ ------→ _____

23. Explain the preparation of $KMnO_4$ from MnO_2.
24. Give reason (a) second ionization enthalpy of copper is very high (b) the spin only magnetic moment of Sc^{3+} is zero (atomic number of Sc = 21)
25. Using VBT, account for the geometry , hybridization and magnetic property of $[Co(NH_3)_6]^{3+}$. (Atomic number of Co = 27)
26. (a)Explain ionization isomerism with example.
    (b)What are homoleptic complexes?

PART D

IV Answer any THREE of the following   5 X 3 = 15

27. (a) Calculate the packing efficiency in face centered cubic lattice.
    (b)Silver forms a cubic close packing lattice. The edge length of the unit cell is 408.6pm. calculate the density of the silver. (given N_A = 6.022 x 10^{23}atoms/mol , Atomic mass of Ag = 1.08g/mol)
28. (a) 1.0g of non-electrolyte solute dissolved in 50g of benzene lowered the freezing point of benzene by 0.4K. find the molar mass of solute. [given freezing point of benzene = 5.12Kkg/mol]
    (b)What are azeotropes? Give an example of maximum boiling azeotropes.
29. (a) The electrode potential for the Daniel cell given below is 1.1V. $Zn_{(s)}|Zn^{2+}{}_{(aq)}||Cu^{2+}{}_{(aq)}|Cu_{(s)}$ write the overall cell reaction and calculate the standard Gibb's ener**gy** change for the reaction (Faraday = 96487C/mol)
    (b) Define molar conductivity and give its SI unit.
30. (a) Derive integrated rate equation for zero order reaction.
    (b) Show that the rate of first order reaction is doubled when the concentration of the reactant is doubled.
31. (a) Give reason for the following
     (i) Brownian movement of the colloidal particles.
     (ii) stability of colloides.
    (b)Name the adsorbent used in the removal of colouring matter from the solution.
    (c) Explain the effect of catalyst on activation energy of the reaction.

PART E

V Answer any FOUR of the following   5 X 4 = 20

32. (a) Explain S_N1 mechanism for the conversion of tertiary butyl bromide to tertiary butyl alcohol.
    (b) What are enantiomers?
    (c) Write the general formula of Grignard reagent.
33. (a) Write the mechanism for the acid catalysed hydration of ethane to ethanol.
    (b)What is Lucas reagent?
     (c) complete the reaction C_2H_5OH ------------$\rightarrow$
34. (a)How does benzaldehyde reacts with acetophenone in the presence of dilute alkali?
    (b)Explain aldol condensation with an example.
     (C) C_6H_5COCl ----------$\rightarrow$ C_6H_5CHO Name the reaction
35. (a) Explain Gabriel Phthalimide synthesis.
    (b)Explain Carbylamine reaction.
    (c)$C_6H_5NO_2$ ----------$\rightarrow$
36. (a)Write the Harworth structure of maltose.
    (b) Give an example of
     (i) Non-essential amino acid
    (ii)Fibrous proteins
    (iii)Globular protein

37. (a) Explain the process of vulcanization of rubber.
     (b) Write the partial structure of Neoprene.
     (c) Name the monomers used for getting the following polymers
        (i)Nylon 6,6 (ii) natural rubber.

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