Instructions:
1. The question paper has four parts: A, B, C and D. All parts are compulsory.
2. Write balanced chemical equations and draw labelled diagrams wherever required.
3. Use log tables and the simple calculator if necessary. (Use of scientific calculators is not allowed).

PART - A

I   **Answer ALL the following questions.**   **10 X 1 = 10**
    (Answer each question in one word or in one sentence)

1. Two liquids A and B on mixing produce a warm solution. Which type of deviation from Raoults law does it show?
2. What freezes out first when a solution of common salt is cooled?
3. Why SHE is named as a reversible electrode?
4. Write the rate equation for the reaction 2A + B --- $\rightarrow$ C, if the order of the reaction is zero.
5. Sky appears blue in colour. Give reason.
6. Name the method used for the purification of Nickel.
7. Give one use of argon.
8. Give the IUPAC name of $CH_3CH=CHC(Br)(CH_3)_2$.
9. $2CH_3\text{-}COCl + (CH_3)_2Cd \text{----}\rightarrow$ X $+CdCl_2$. What is X?
10. Write the structure of sugar present in RNA.

PART - B

II   **Answer any FIVE of the following (Each question carries 2 marks).**   **5 X 2 = 10**

11. Account for the following:
    (a) Metallic crystals show high electrical conductivity.
    (b) Molecular crystals are soft and volatile
12. State Faradays second law.
13. Rate constant of a first order reaction is 2.3 x $10^{-4}s^{-1}$. Calculate the time taken for the completion of $2/3^{rd}$ of the reaction.
14. Atomic sizes of 3d series elements from chromium to copper are almost same. Give reason.
15. How is salicylic acid converted to aspirin?
16. Describe haloform reaction with an example.
17. What are tranquilizers? Give examples.
18. What are artificial sweeteners? Which artificial sweetener is stable at cooking temperature?
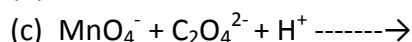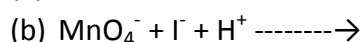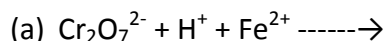
PART – C

III.   **Answer any FIVE of the following (Each question carries 3 marks).**   **5 X 3 = 15**

19. Explain the extraction of aluminium from purified alumina by Hall-Heroult process.
20. (a) How does copper react with dil. HNO_3?
    (b) Which allotropic form of phosphorous exhibits chemiluminescence?   **(2+1)**
21. Explain the steps involved in the manufacture of sulphuric acid by contact process.
22. (a) Complete the following reactions:
    (i) $NH_3 + Cl_2$ -----$\rightarrow$ _____ + _____
    (ii) $Na_2SO_3 + Cl_2 + H_2O$ -------$\rightarrow$ _____ + _____
    (c) Hydrogen fluoride is liquid, but other hydrogen halides are gases. Give reason.   **(2+1)**

23. Complete the following chemical equations for reactions in aqueous solutions:

(a) $Cr_2O_7^{2-} + H^+ + Fe^{2+}$ ------$\rightarrow$

(b) $MnO_4^- + I^- + H^+$ --------$\rightarrow$

(c) $MnO_4^- + C_2O_4^{2-} + H^+$ -------$\rightarrow$

24. (a) Name the element in the 3d series that shows

(i) Maximum oxidation state.

(ii) Diamagnetic in nature.

(b) Mention the type of compounds formed when small atoms like H, C & N get trapped inside the crystal lattice of transition metals. (2+1)

25. Using VBT account for the geometry and magnetic property of the complex $[NiCl_4]^{2-}$.

26. State the postulates of Werner's theory of coordination compounds.

PART - D

IV. Answer any THREE of the following (Each question carries 5 marks). 3 X 5 = 15

27. (a) Calculate the number of particles in FCC and BCC.
    (b) What type of defect can arise when a solid is heated? Which physical property is affected by it?
    (3+2)

28. (a) Osmotic pressure of a solution containing 7g of protein per 100ml of solution is 25mm of Hg at 310K. Calculate the molecular mass of protein (R = 0.0821 L atm $K^{-1}mol^{-1}$).
    (b) State Raoults law of binary solutions. **(3+2)**

29. (a) What are the methods of prevention of corrosion?
    (b)What is the relation between ΔG^o and EMF of the cell? EMF of Daniel cell is 1.1 V under standard conditions, at 298K . Calculate the equilibrium constant for $Zn + Cu^{2+} \leftrightarrow Zn^{2+} Cu$ **(3+2)**

30. (a) Half-life period for a reaction A -----$\rightarrow$ products at 298K is 3.33hours. Calculate the rate constant for the reaction. If the reaction is started from one mole of A, what amount of A would remain unreacted at the end of 9 hours?
    (b) Explain graphically how a catalyst influences the rate of a chemical reaction. **(3+2)**

31. (a) Explain electrophoresis.
    (b) How do lyophilic colloids serve as protective colloids?
    (c) State Hardy-Schulze rule. **(2+2+1)**

V. Answer any FOUR of the following (Each question carries 5 marks). 4 X 5 = 20

32. (a) Write any three differences between S_N1 and S_N2 reactions.
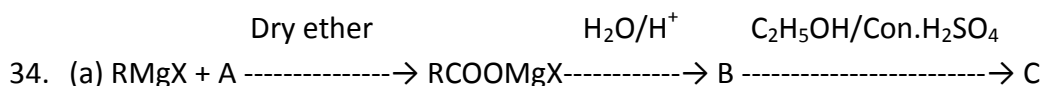   (b) Give one use of each of the following:
    (i) Freon (ii) Iodoform **(3+2)**

33. (a) Explain with an equation
    (i) Dow's process for the manufacture of phenol.
    (ii) Friedel Craft's alkylation of anisole.
    (b) Why do alcohols have high boiling points compared to ethers and hydrocarbons?
    (4+1)

                 Dry ether H_2O/H^+ $C_2H_5OH/Con.H_2SO_4$

34. (a) RMgX + A ---------------$\rightarrow$ RCOOMgX------------$\rightarrow$ B ------------------------$\rightarrow$ C
    What are A, B and C?
    (b) Explain Wolf-Kishner reaction with an example. (3+2)

35. (a) Write equations for
    (i) Hoffmann bromamide degradation reaction.
    (ii) Carbylamine reaction.
    (iii) Formation of p-aminoazobenzene.

(b) Explain acetylation of ethanamine.   **(3+2)**

36.   (a) What are zwitter ions? Write the zwitter ion structure of glycine.

        (b) Write the Haworth structure of β-D-fructofuranose.

         (c) What are vitamins?   **(2+2+1)**

37.   (a) (i) Write the monomer structure of natural rubber. Give its IUPAC name.

          (ii) Name the monomer unit of Nylon-6.

         (b) Give one use of Teflon and Nylon-6,6.   **(3+2)**

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JAIN COLLEGE, J C Road Bangalore
Mock Paper – 2, February - 2015
II PUC – Chemistry (34)

Time: 3 Hours 15 Minutes   Max. Marks:70

Instructions:
1. The question paper has four parts: A, B, C and D. All parts are compulsory.
2. Write balanced chemical equations and draw labelled diagrams wherever required.
3. Use log tables and the simple calculator if necessary. (Use of scientific calculators is not allowed).

PART - A

I.   **Answer all the following questions:**   10 x 1 = 10
1. Why is vapour pressure of a solution of glucose in water lower than that of water?
2. Which of the following has higher boiling point 0.1M NaCl or 0.1M Glucose?
3. A mixture of $CuSO_4$ and $AgNO_3$ are dissolved in water . What is the product at cathode? Given $E^o{}_{Ag^+/Ag}$ = 0.80v and $E^o{}_{Cu^{2+}/Cu}$= 0.34V. Explain.
4. The unit of the velocity constant for a chemical reaction is mol $m^{-3}s^{-1}$. What is the order of the reaction?
5. What is emulsion?
6. State the role of Silica in the metallurgy of copper.
7. Complete the equation: $XeF_4 + O_2F_2$ ⟶ _____ + _____
8. Arrange the following in the increasing order of their of their melting points
   i) Bromoethane   ii) Bromoform   iii) Chloromethane   iv) Dibromomethane.
9. What is Tollen's reagent?
10. Name the Storage polysaccharide in plants.

PART – B

II.   **Answer any FIVE of the following (Each question carries 2 marks):**   5 x 2 = 10

11. A compound A_xB_y crystallises in a FCC lattice in which A occupies each corner of a cube and B occupies the centre of each face of the cube. What is the formula of the compound?
12. What are the reactions taking place at cathode and anode during the electrolysis of aq. NaCl?
13. Differentiate between average and instantaneous rate of a reaction.
14. Calculate the magnetic moment of M^{2+} ion (Z = 27).
15. What happens when vapours of secondary alcohol are passed over heated copper at 573K? Write the reaction.
16. Give any two tests to differentiate an aldehyde from a ketone.
17. Give one example each for
    i) Antihistamine;   ii) Antifertility drug.
18. What are food preservatives? Give example.

III. **Answer any FIVE of the following (Each question carries 3 marks):**   5 x 3 = 15

19. Explain Van Arkel method for refining of Zirconium or Titanium.
20. Explain the manufacture of ammonia by Haber's process with the help of flow chart.
21. a) How does conc.H_2SO_4 reacts with copper? Give equation.
    b) Name the oxidized product obtained when ozone reacts with lead sulphide.
22. a) Explain the preparation of chlorine from potassium permanganate with equation.
    b) What is aqua regia?
23. a) Give reason i) many of the transition elements are known to show variable oxidation states;
     ii) Actinide contraction is greater from element to element than lanthanoid contraction.

24. Describe how potassium permanganate is prepared from pyrolusite. Write the chemical equations for the reactions involved.

25. Using VBT explain the geometry and magnetic property of the complex $[Co(NH_3)_6]^{3+}$ ion.

26. a) Explain the crystal field splitting in an octahedral field.

    b) Give an example for an ambidentate ligand.

IV.   Answer any THREE of the following (Each question carries 5 marks):   3 x 5 = 15

27. a) Calculate the packing efficiency in simple cubic system.

    b) What are semiconductors? Explain n- type semiconductors.   2+1

28. a) The vapour pressure of pure water at 20°C is 17.5mm of Hg. A solution of sucrose is prepared by dissolving 68.4 g of sucrose in 1000g water. Calculate vapour pressure of solution.

    b) What is reverse osmosis? Give application.   2+1

29 a) Standard potential of Fe/ Fe^{2+} and Al / Al^{3+} electrode are – 0.44v and – 1.66V respectively.

    For the cell Al / Al^{3+} (0.01M) II Fe^{2+} (0.001M)/ Fe

    a) Write the cell reaction;

    b) Calculate the cell potential;

    c) Calculate the equilibrium constant of the cell reaction at 298K.

30. a) Show that for a first order reaction, time required for 99.9% of the reaction to take place is 10 times the time required for the completion of half of the reaction.

    b) How does temperature influence the reaction rate?   2+1

31 a) Explain cleansing action of soap.

    b) What is Brownian movement?

    c) What is coagulation?   1+1+1

V.   Answer any FOUR of the following (Each question carries 5 marks):   4 x 5 = 20

32. a) Chlorobenzene is extremely less reactive towards nucleophilic substitutions. Give two reasons for the same.

    b) Complete the following reactions:

    i) $C_2H_5 – Cl + Ag\ CN\ _{(alc)} \xrightarrow{Heat}$

    ii) $C_6H_5– Cl + Conc.\ (HNO_3 + H_2SO_4) \xrightarrow{Heat}$

    iii) $2\ C_2H_5\ Br \xrightarrow{Na/\ Ether}$ 2+1+1+1

33. a) Complete the following reactions:

    i) $R–CHO + R^{|}MgX \xrightarrow{H_2O}$ _____ $\xrightarrow{H_2O/H^+}$ _____

    ii) $C_6H_5OH + Zn \longrightarrow$ _____ $+ ZnO$

    iii) Describe Williamson's ether synthesis.   3+2

34. a) Explain the mechanism involved in addition of HCN to an aldehyde taking an example.

    b) Arrange the following carboxylic acids in the increasing order of their acidity and justify your answer.
    CCl_3COOH , CH_3COOH, $CH_2ClCOOH$, $CHCl_2COOH$.   3+2

35 a) Complete the following reaction:

    i) $ArN_2^+ X^- \xrightarrow{CuCl/\ HCl}$ _____ $+ N_2$.

    ii) $ArN_2^+Cl^- + C_6H_5OH \xrightarrow{OH^-}$ _____ $+ Cl^- + H_2O$.

    iii) $Ar\ SO_2Cl +C_2H_5NH_2 \longrightarrow$ _____ $+ HCl$.

    b) Write a note on nitration of Aniline.   3+2

36. a) i) What is denaturation of protein?
    ii) Give an example of basic α –amino acid
    b) Write the Haworth structure of α- D (+) Glucose.   2+1+2

37. a) Give the name of the monomer of natural rubber. Explain the process of vulcanization and mention its use.
    b) What are thermosetting polymers? Give example.   3+2

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