GOVERNEMENT OF KARNATAKA

KARNATAKA SCHOOL EXAMINATION AND ASSEMENT BOARD

6th CROSS, MALLESHWARAM, BENGALURU-560003

2026-27 II PUC MODEL QUESTION PAPER-4

Subject: 34 = Chemistry **Maximum Marks:** 70

Time: 3.00 Hours **No. of Questions:** 46

Instructions

1. Question paper has FIVE parts. All parts are compulsory.
2. a. Part-A carries 20 marks. Each question carries 1 mark.
   b. Part-B carries 06 marks. Each question carries 2 marks.
   c. Part-C carries 15 marks. Each question carries 3 marks.
   d. Part-D carries 20marks. Each question carries 5 marks.
   e. Part-E carries 09 marks. Each question carries 3 marks.
3. In Part-A questions, **first attempted answer** will be considered for awarding marks.
4. Write balanced chemical equations and draw neat labeled diagrams and graphs wherever necessary.
5. Direct answers to the numerical problems without detailed steps and specific unit for final answer will not carry any marks.
6. Use log tables and simple calculator if necessary (use of scientific calculator is not allowed).
7. For a question having circuit diagram/figure/ graph/ diagram, alternate questions are given at the end of question paper in a separate section for visually challenged students.

PART-A

I. Select the correct option from the given choices. **15 ×1 = 15**

1. Main component of the cell wall of plants is
   (a) starch (b) glucose
   (c) cellulose (d) amino acids

2. Desalination of sea water is carried out by the process
   (a) Exosmosis (b) Endosmosis
   (c) Reverse osmosis (d) Osmosis

3. Identify the incorrect statement about $[Co(NH_3)_6]^{+3}$
   (a) It is low spin complex (b) Its hybridization is sp^3d^2
   (c) It is diamagnetic in nature (d) Its geometry is octahedral

4. Alcohol reacts immediately with anhydrous $ZnCl_2$ + HCl and gives insoluble alkyl chloride is
   (a) isopropyl alcohol (b) methanol
   (c) 2-methylpropan-2-ol (d) 2-butanol

5. Factor that changes in presence of a catalyst during chemical reaction is
   (a) Activation energy of reaction (b) Gibb's energy of reaction
   (c) Equation constant (d) Enthalpy of reaction

6. The amine which forms isocyanide with chloroform and alcoholic potassium hydroxide is
   (a) N-Methylmethanamine (b) N,N-Dimethylmethanamine
   (c) N-Ethylethanamine (d) Benzenamine

7. Choose the weakest acid among the following.
   (a) $(CH_3)_2CHCOOH$ (b) F_3CCOOH
   (c) CH_3COOH (d) FCH_2COOH
8. Given below are two statements:

   Statement-I: The cell potential becomes half if the cell reaction is divided by 2 throughout.

   Statement-II: Cell voltage is an extensive quantity.

   In the light of the above statements, choose the most appropriate answer from the options given below:

   (a) Both statement I and II are incorrect

   (b) Both statement I and II are correct.

   (c) Statement I is incorrect but statement II is correct.

   (d) Statement I is correct but statement II is incorrect
9. Which of the following cannot be prepared by Gabriel phthalimide synthesis?
   (a) Ethylamine (b) Methylamine
   (c) Aniline (d) Propylamine
10. Coordination number and oxidation state of 'Fe' for the complex $\left[Fe(C_2O_4)_3\right]^{3-}$
   (a) 6, +3 (b) 5, +2
   (c) 4, +3 (d) 3, +6
11. The formation of cyanohydrin from a ketone is an example of
   (a) nucleophilic addition reaction (b) electrophilic substitution reaction
   (c) electrophilic addition reaction (d) nucleophilic substitution reaction
12. Chlorobenzene on reaction with NaOH at 623 K and 300atm pressure followed by acidic hydrolysis produces
   (a) Phenol (b) Sodium phenoxide
   (c) Benzaldehyde (d) Benzoic acid
13. The pair of ions that has the same electronic configuration is
   (a) Cu^{2+}, Cr^{2+} (b) Co^{3+}, Ni^{3+}
   (c) Fe^{3+}, Mn^{2+} (d) Sc^{3+}, Cr^{3+}
14. The mixture that forms maximum boiling azeotrope is
   (a) heptane + octane (b) water + nitric acid
   (c) ethanol + water (d) acetone + carbon disulphide
15. Pick the correct increasing order of boiling points of the following compounds.

   Propan-1-ol, butan-1-ol, butan-2-ol, pentan-1-ol

   (a) Propan-1-ol, butan-2-ol, butan-1-ol, pentan-1-ol

   (b) Propan-1-ol, butan-1-ol, butan-2-ol, pentan-1-ol

   (c) Pentan-1-ol, butan-2-ol, butan-1-ol, propan-1-ol

   (d) Pentan-1-ol, butan-1-ol, butan-2-ol, propan-1-ol

II. Fill in the blanks by choosing the appropriate word from those given in the brackets:
(cyanides, alcohols, Zr, oligosaccharides, increases, decreases) **5 ×1 = 5**

16. When a non-volatile solute is added to the pure solvent, the freezing point of solvent_____.

17. Hf and _____ have almost identical radii.

18. Haloalkanes react with KCN to form _____ as major product.

19. Hydroxyl derivatives of alkane are called _____.

20. Carbohydrates that yield two to ten monosaccharide units, on hydrolysis, are called _____.

PART – B

III. Answer any three of the following. Each question carries 2 marks. **3 × 2 = 6**

21. Explain the preparation of methyl iodide by Finkelstein reaction with the chemical equation.

22. What is the half-life of a reaction? Represent it symbolically.

23. List any two nitrogenous bases commonly found in both DNA and RNA.

24. Write any two characteristics of interstitial compounds.

25. Explain Williamson's ether synthesis with the general chemical equation.

PART – C

IV. Answer any three of the following. Each question carries 3 marks. **3 × 3 = 9**

26. State any three postulates of Werner's theory of coordination compounds.

27. Write any three differences between lanthanoids and actinoids.

28. Using Valence Bond Theory: account for hybridisation, geometry and magnetic property of $[NiCl_4]^{2-}$ ion.

29. Complete the following chemical equations.

(i) _____ + 8 Na_2CO_3 + 7 O_2 ⟶ 8 Na_2CrO_4 + 2 Fe_2O_3 + 8 CO_2

(ii) 2 Na_2CrO_4 + _____ ⟶ $Na_2Cr_2O_7$ + 2 Na^+ + H_2O

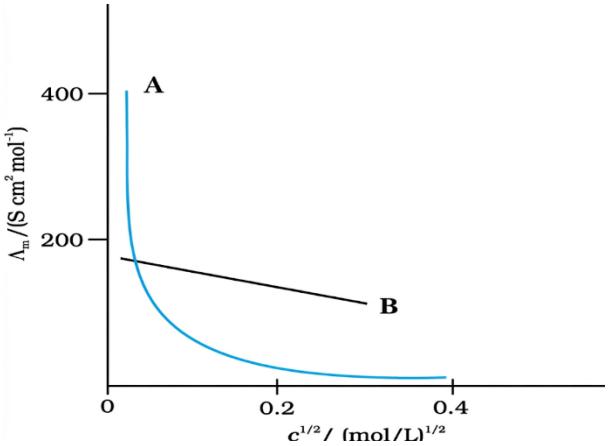
(iii) $Na_2Cr_2O_7$ + 2 KCl ⟶ _____ + 2 NaCl

30. Explain the formation of M-C σ-bond and M-C π-bond in metal carbonyls with structure. Where "M" and "C" are metal and carbon atom of carbonyl group respectively.

V. Answer any two of the following. Each question carries 3 marks. **2 × 3 = 6**

31. Derive integrated rate equation for a first order reaction.

32. From the below given graph, identify the nature (type) of electrolyte A and electrolyte B. Among A and B which electrolyte's limiting molar conductivity cannot be obtained from this graph?



33. What are ideal solutions? Write two characteristics of it.

34. What are galvanic cells? Write the reduction and oxidation half reactions for the chemical reaction $Zn(s) + Cu^{2+}(aq) \longrightarrow Zn^{2+}(aq) + Cu(s)$.

PART – D

VI. Answer any four of the following. Each question carries 5 marks. **4 × 5 = 20**

35. (a) What are organo-metallic compounds? Explain how RMgX (Grignard reagent) reacts with water with the help of a chemical equation.

    (b) Write the IUPAC name of major product obtained when anisole undergoes Friedel-Crafts methylation and mention the catalyst used in it. **(3+2)**

36. (a) Illustrate the preparation of glucose from starch with chemical equation.

    (b) Write the structure of glycine. Mention the number of peptide linkage/s present in glycylalanine.

    (c) Which vitamin deficiency causes convulsions **(2+2+1)**

37. (a) How is benzene converted into benzaldehyde by the Gatterman-Koch reaction? Write a chemical equation.

    (b) Write the chemical equation involved in the Wolff-Kishner reduction of ethanal and mention the stable gas evolved during in this reaction.

    (c) Give the chemical composition of Tollens' reagent. **(2+2+1)**

38. (a) Mention any three factors which decide the basic strength of alkyl amines in aqueous solution.

    (b) How is aniline obtained from nitrobenzene? Write the chemical equation. **(3+2)**

39. (a) Mention the hybridization of carbon atoms to which the hydroxyl group is bonded in allylic alcohols, phenol and vinylic alcohols, respectively.

    (b) How do you prepare aspirin from salicylic acid? Write chemical equation. **(3+2)**

40. (a) What is the final organic product obtained on hydrolysis of benzamide? Write the chemical equation.
    (b) How do the electron withdrawing groups and electron donating groups affect the acidic strength of carboxylic acid?
    (c) Write the composition of sodalime. **(2+2+1)**

PART – E (PROBLEMS)

VII. Answer any three of the following. Each question carries 3 marks. **3 × 3 = 9**

41. Time required to decompose SO_2Cl_2 to half of its initial amount is 60 minutes. If the decomposition is a first order reaction, calculate the rate constant of the reaction.

42. A solution containing 34.2g of cane sugar ($C_{12}H_{22}O_{11}$) dissolved in 500 cm^3 of water froze at –0.374°C. Calculate the freezing point depression constant of water. [Given: Density of water = $1.0\,g\,cm^{-3}$]

43. Calculate the potential of hydrogen electrode in contact with a solution whose pH is 10.

44. The vapor pressure of water is 92 mm Hg at 323 K. 18.1g of nonelectrolyte solute is dissolved in 100 g of water the vapor pressure is reduced by 5 mm Hg. Calculate the molar mass of solute.

45. The rate constants of a reaction at 500K and 700K are $0.02s^{-1}$ and $0.07s^{-1}$ respectively. Calculate the value of E_a. [Given: R = $8.314\ J\,K\,mol^{-1}$]

46. A solution of $Ni(NO_3)_2$ is electrolyzed between platinum electrodes using a current of 5 amperes for 20 minutes. What mass of Ni is deposited at the cathode? [Given: Atomic mass of Ni = 58.70 $g\,mol^{-1}$ and F=96500 $C\,mol^{-1}$]

PART – F

(For visually challenged students only)

32. Write a neat labelled diagram of H_2-O_2 Fuel cell and express its cathodic and anodic reactions.

****