JAIN COLLEGE V V Puram II PUC MOCK PAPER - I : January. 2025	Course: II PUC Subject: Chemistry Max.Marks: 70 Duration: 3hr

Maximum Marks: 70

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 20 marks. 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).

PART - A

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

1. Copper dissolved in gold is an example for which solution?
   a) Gas in solid b) liquid in solid c) solid in solid d) solid in liquid
2. The Molar Conductivity is known as Limiting Molar Conductivity when concentration approaches
   a) Zero b) Unity c) Infinity d) none of the above
3. The electronic conductance depends on
   a) Nature and Structure of the metal b) Number of valence electrons per atom
   c) Temperature d) All of the above
4. The inversion of Cane Sugar is an example for which reaction
   a) First Order b) Second Order c) Zero Order d) Pseudo first order
5. Which of the following is not regarded as Transition metal?
   a) Zn, Cd and V b) Zn , Mn and Co c) Cd, Ti and Mn d) Zn, Cd and Hg
6. $KCl.MgCl_2.6H_2O$ is the molecular formula of which of the following double salt?
   a) Carnallite b) Mohr's Salt c) Potash Alum d) Phosgenite
7. Phenol is also called as
   a) Carboxylic acid b) Carbolic acid c) Salicylic acid d) Ethanoic acid
8. The common name of Benzene-1,2-diol is
   a) Resorcinol b) Quinol c) Catechol d) Cresol
9. Glucose and Fructose undergo fermentation in the presence of which enzyme;
   a) Zymase b) Sucrase c) Amylase d) Maltase
10. Conversion of Benzene to Benzaldehyde in the presence of anhydrous $AlCl_3$ or CuCl is which named reaction
    a) Etard b) Stephen c) Rosenmund d) Gatterman –Koch

11. Fehling solution B is _____
    a) Copper sulphate b) Alkaline Sodium Potassium Tartarate
    c) Sodium Borohydride d) Zinc-Amalgam
12. Which of the following compound is used as an anaesthetic in dentistry
    a) Adrenaline b) Ephedrine c) Novocain d) Benadryl
13. Which of the following is known as Hinsberg's Reagent?
    a) Benzene Sulphonyl Chloride b) Carbylamine
    c) Methanamine d) Sodium Nitrite
14. Starch consist of which of the following components:
    a) Amylose b) Amylopectin c) Both a and b d) none of the above
15. Which one of the following is essential amino acid
    a) Valine b) Glycine c) Alanine d) Glutamine

II. Fill in the blanks by choosing the appropriate word from those given in the brackets:
(Independent, Scandium, Cryoscopic constant, Pyramidal, Freons) 5×1 = 5

16. Freezing point depression constant, K_f is also called as _____
17. For First order reaction $t_{1/2}$ is _____ of $[R]^0$
18. _____ is a transition element which does not exhibit variable oxidation states.
19. The Chlorofluorocarbon compound of ethane and methane are called as _____.
20. The geometry present in amines is _____.

III. Answer any three of the following. Each question carries two marks. 3 × 2 = 06

21. What are Azeotropes? Mention its types.
22. Give two factors which influence the rate of the chemical reaction?
23. What are homoleptic and heteroleptic complexes? Give examples.
24. What are enantiomers? Give examples
25. Write the Etard reaction for Toulene?
26. What is a zwitter ion? Give the zwitter ion structure of glycine.

PART - C

IV. Answer any three of the following. Each question carries three marks. 3 × 3 = 09

27. Calculate the magnetic moment of a divalent ion in aqueous solution its atomic number is 25?
28. Explain the manufacture of Potassium dichromate($K_2Cr_2O_7$), with balanced chemical equation.
29. a) Give any two difference between Lanthanoids and Actinoids (2+1)
    b) Actionids show variable oxidation state.Give reason.
30. Define isomerism in co-ordination compounds. Give the types of structural isomerism with examples for each?
31. Using Valence bond theory(VBT), explain geometry, hybridization and magnetic property of $[Co(NH_3)_6]^{3+}$ (Atomic number of Cobalt = 27).
32. a) Draw the energy level diagram to show 'd' orbital splitting in an octahedral crystal field.
    b) Which type of isomerism arises in coordination compound containing ambidentate ligand? (2+1)

V. Answer any two of the following. Each question carries three marks. 2 × 3 = 06

33. i)What is Raoult's law? Give its mathematical equation.
    ii) Define osmotic pressure. (2+1)
34. State Kohlraush law of independent migration of ions. Mention the two applications of the same.
35. What is an electrolytic cell? State Faraday's first and second law of electrolysis.
36. What is a zero order reaction? Derive integrated rate equation for zero order reaction.

PART - D

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

37. a) Explain substitution nucleophilic bimolecular (SN_2) reaction mechanism with equations.
    b) What are ambident nucleophiles? Give an example. (3+2)
38. a) Give the mechanism of acid catalysed hydration reaction of alkenes.
    b) Explain the preparation of phenol by Cumene's process. (3+2)
39. How are the following conversions carried out?
    a) Propene → Propan-2-ol (1mark each)
    b) Benzyl chloride → Benzyl alcohol
    c) Ethyl magnesium chloride→ Propan-1-ol
    d) Butan-2-one → Butan-2-ol
    e) Phenol → Salicylaldehyde
40. a)Complete the following reaction
    i)$RCOOH + PCl_5$ → _____+ _____+_____.
    ii)$3RCOOH + PCl_3$ → _____+ _____.
    iii)$RCOOH + SOCl_2$ → _____+ _____+_____.
    b) Explain Hell-Volhard-Zelinsky (HVZ) reaction (3+2)
41. .Give the structural Elucidation of Glucose. (5)

42. a) i) $C_6H_5CONH_2 \xrightarrow{\mathbf{Br_2/NaoH}} X \xrightarrow[\mathbf{0°C}]{NaNO_2, HCl} Y$, Identify X and Y in the reaction.
    ii)Name the reaction occurring in step (i)
    b) What is Lucas reagent? Which class of alcohols does not readily form turbidity with Lucas reagent

PART – E (PROBLEMS)

VII. Solve any three problems of the following. Each question carries three marks. 3 × 3= 9

43. Calculate the mole fraction of Ethylene glycol ($C_2H_6O_2$) in a solution containing 20% of $C_2H_6O_2$ by mass. 45 g of Ethylene glycol ($C_2H_6O_2$) is mixed with 600g of water. Calculate
    a) The freezing point depression
    b) The freezing point of the solution.
44. The Vapour pressure of pure liquids A and B are 450 and 700 mmHg respectively , at 350K. Find out the composition of the liquid mixture if total vapour pressure is 600 mmHg . Also find the composition of the vapour phase .
45. The standard electrode potential for daniell cell is 1.1V . Calculate the standard gibbs energy for the reaction:
    Zn(s) + Cu2+(aq) Zn2+(aq) + Cu(s)
46. Calculate the Equilibrium constant of the reaction :
    Cu(s) + 2Ag+(aq) Cu2+(aq) + 2Ag(s)
    Eo(cell) = 0.46V
47. Resistance of a conductivity cell filledwith 0.1 mol L-1 KCl solution is 100 ohm . If the resistance of the same cell when filled with 0.02 mol L-1 KCl solution is 520 ohm . Calculatethe conductivity and molar conductivity of 0.02 mol L^{-1} KCl solution . The conductivity of 0.1 mol L KCl solution is 1.29 S/m .