JAIN COLLEGE V V Puram **2nd PUC MOCK Paper – Jan. 2024**	**Course:** 2nd year PUC **Subject:** Chemistry **Max. Marks:** 70 **Duration:** 3:15 hour

Instructions:

i. **The question paper has four parts. All the four parts are compulsory PART -A carries 20 marks, each question carries one mark.**
ii. **PART- B carries 8 marks. Each question carries two marks**
iii. **PART -C carries 12 marks. Each question carries three marks PART-D carries 30 marks. Each question carries five marks ii. Write balanced chemical equations and draw diagrams wherever necessary Use log table and simple calculators if necessary (use of scientific calculator is not allowed)**

Part A

I. Select the correct option from the given choices **1x15=15**

1. Sprinkling of salt helps in clearing the snow covered road in hills. The phenomenon involved in process is
   a) lowering of vapour pressure of snow.
   b) depression in freezing point of snow
   c) melting of ice due to increase in temperature by pitting salt.
   d) increase in the freezing point of snow>/100ml
2. The complex formed by ammonia with Zn^{2+} ions in the dry cell is
   a)$[Zn(NH_3)_4]^+$ b) $[Zn(NH_3)_4]^{2+}$ c) $[Zn(NH_3)_2]^+$ d) $[Zn(NH_3)_2]^{2+}$
3. The standard electrode potential of 3 metals X, Y and Z are -1.2V, +0.5V and -3.0V respectively. The reducing power of these metals will be
   a) Y>Z>X b) X>Y>Z c) Z>X>Y d) X>Y>Z
4. The role of catalyst is to change
   a) Gibb's enery of reaction b) enthalpy of reaction
   c) activation energy of reaction d) equilibrium constant
5. The paramagnetic/coloured ion among the following is
   a) Ti^{3+} b) Cu^+ c) Zn^{2+} d) Sc^{2+}
6. The solution of the complex $K_4[Fe(CN)_6]$ in water will
   a) give the test for K+ ions b) give the test for Fe^{2+} ions
   c) give the test for CN^- ions d) none of the above.
7. The aerial oxidation of chloroform in sunlight to phosgene can be checked by
   a) keeping chloroform in coloured bottles b) adding few drops of 1% ethanol
   c) adding few drops of dilute HCl or NaOH d) Both a and b
8. Styrene on acid catalyzed hydration gives
   a) 1-phenyl ethanol b) 2-phenyl ethanol c) phenyl carbinol d) cyclohexylmethanol
9. The product formed by the oxidation phenol with chromic acid is
   a) conjugated diene b) conjugated triene c)conjugated diketone d) trihydric alcohol
10. Calcium benzoate and calcium acetate when heated together gives
    a) acetophenone b) benzophenone c) acetone d) none of these
11. 4-methyl acetophenone on heating with alkaline $KMnO_4$ followed by hydrolysis with dilute H_2SO_4 gives
    a) tollen b) acetophenone c) terephthalic acid d) phthalic acid
12. An organic compound A on reduction gives compound B which on reaction with trichloro methane and caustic potash form C. The compound C on catalytic reduction give N-methyl benzenamine, the compound A is
    a) nitrobenzene b) nitromethane c) methanamine d) benzenamine

13. Which of the following compound will not undergo azo coupling with benzenediazonium chloride ?
a) aniline b) phenol c)anisole d) nitrobenzeneone
14. Which of the following does not have glycosidic linkage. chemical name of
a) sucrose b) amylose c) galactose d) maltose
15. The nitogeneous base adenine pair with thymine by
a) 1H bond b) 4H bond c) 3H bond d) 2H bond

II. Fill in the blanks by choosing the appropriate word from those given in the brackets. 1 x 5 = 5

[plane of symmetry, positive, zero, tertiary amines, rate constant, first]

16. A solution of acetone in ethanol shows _____ deviation from Raoult's law.
17. The half-life period of a zero order reaction is inversely proportional to the _____
18. Dehydrohalogenation of ethyl chloride is an example for _____ order.
19. Meso compounds are optically inactive due to _____.
20. Benzene sulphonyl chloride will not give precipitate with _____ .

Part B

III. Answer any three of the following. Each question carries two marks: 3 x 2 = 6

21. State Raoult's law of relative lowering of vapour pressure. Write its mathematical form.
22. Write the rate expression for the reaction :
$aA + bB \rightarrow cC + dD$
23. a) In the below ligands identify the unsymmetrical ligand i) ox ii) en iii) gly iv) SO_4^{2-}
b) Give an example for meridional isomerism.
24. Explain swartz reaction with suitable example.
25. Explain aldol condensation with suitable example.
26. How do you confirm the presence of aldehydic group in glucose? Explain with equation.

Part C

IV. Answer any three of the following. Each question carries three marks: 3x3=9

27. Explain the preparation of $K_2Cr_2O_7$ from chromite ore.
28. The chromates and dichromates are interconvertible by the change in P^H medium. Why? Give chemical equation
29. Explain crystal field splitting in octahedral co-ordination entities.
30. Name the complex compounds are applicable in
i. Platinum complex used to inhibit the growth of tumors
ii. Electroplating of silver.
iii. Rhodium complex used for hydrogenation of alkenes.
31. a) What is synergic effect?
b) What are homoleptic complexes? Give example.
32. Give any three limitations of valence bond theory.

V. Answer any two of the following. Each question carries three marks. 2x3=6

33. Give the main points of distinction between non –ideal solutions showing positive and negative deviations.
34. State Kohlrausch's law of independent migration of ions. Mention two applications of it.
35. What is ionic conductance? How does conductivity and molar conductivity vary with concentration?
36. a) Show that half-life period for first order reaction is independent of initial concentration of reactants.
b) The rate of a reaction has rate constant $k = 8.74 \times 10^{-11}\ mol^{-2}L^2s^{-1}$. What is the order of the reaction?

Part D

VI. Answer any four of the following. Each question carries five marks 4 x5=20

37. a) Explain S_N2 reaction mechanism with a suitable example.
    b) Explain dehydrohalogenation by taking 2-chloro pentane. Name the major product.
38. a) Explain the preparation of propanol from propene and name the rule involved.
    b) Write the equation for the preparation of tertiary butyl methyl ether by Williamson's ether synthesis.
39. a) Explain the conversions of
    i) phenol to picric acid
    ii) phenol to benzene
    iii) give an example for mixed ether.
40. a) Explain Cannizaro's reaction with an example.
    b) Write the chemical composition of Tollen's reagent. Name the carbonyl compound answer for Tollen's test.
    c) What is formalin?
41. a) Give the equation for the conversion of ethanoic acid to ethanoic anhydride.
    b) Explain esterification reaction and write the equation.
42. a) Write the chemical equation for benzene diazonium chloride reacts with aniline. Mention the colour of the product.
    b) How is primary and secondary amine distinguished by Hinsberg reagent?
43. a) Give an two differences between amylose and amylopectin.
    b) What is fibrous protein? Give an example.
    c) Name the disease caused by the deficiency of vitamin D.

Part E

VII. Answer any three of the following. Each question carries three marks. 3 x3=9

44. At 400K 1.5g of unknown substance is dissolved in solvent and the solution is made to 1.5. Its osmotic pressure is found to be 0.3bar. Calculate the molar mass of the unknown substance.
    (given R= 8.314 X 10^{-2}LbarK^{-1} mol^{-1})
45. Normal molar mass of a solute is 246g/mol and observed molar mass of the solute is 346g/mol. Calculate the value of i? Comment on the state of the solute in the solvent.
46. The resistance of 0.01molar acetic acid solution is found to be 2220ohm when measured in a conductivity cell with cell constant 0.366cm^{-1}. Calculate conductivity and molar conductivity.
47. Calculate limiting molar conductivity of calcium sulphate. Limiting molar conductivity of calcium and sulphate ions are 119.0 and 160.0Scm^{2}mol^{-1} respectively.
48. Calculate time taken to reduce 20mol/L reactant to 5 mol/L of reactant for the first order reaction has rate constant 1.15 x 10^{-3}s^{-1}.
49. The rate of chemical reaction quadruples for an increase of temperature 303K from 323K. Calculate energy of activation of the reaction assuming that it does not change with temperature.

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