JGi JAIN COLLEGE V V Puram

II PUC MOCK PAPER – II : January. 2025

Course:	II PUC
Subject:	Chemistry
Max.Marks:	70
Duration:	3hr

Instructions:

1) **The 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 (problem) 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.   The solubility of a gas increases in a liquid with
  (a) Increase of temperature   (b) Reduction of gas pressure
  (c) Decrease in temperature   (d) Amount of liquid taken

2.   The unit of electrochemical equivalent is
  (a) Gram   (b) Gram / Ampere
  (c) Gram/ Coulomb   (d) Coulomb / gram

3.   In an $H_2 - O_2$ fuel cell,
  (a) The cell reaction is $2H_2O\ (l) \rightarrow 2H_2(g) + O_2(g)$ (b) The cell reaction is $2H_2(g) + O_2(g) \rightarrow 2H_2O\ (l)$
  (c) The cell voltage is 2.0 V (d) Chemical energy is stored

4.   In a reversible reaction, the function of the catalyst is
  (a) To increase the rate of the forward reaction
  (b) To influence the forward and backward reactions to the same extent
  (c) To reduce the time required for reaching the equilibrium state
  (d) To alter the velocity of the reaction

5. Which one of the following has the maximum number of unpaired electrons
   (a) Mg^{2+} (b) Ti^{3+} (c) V^{3+} (d) Fe^{2+}

6. Ligands, in complex compounds
   (a) Accept e^- -pair   (b)Donate e^- -pair
   (c) Neither accept e^- -pair nor donate   (d)All of these happen

7. Conversion of glucose into ethyl alcohol is made by an enzyme
   (a)Zymase   (b)Invertase   (c)Maltase   (d)Diastase

8. Phenol molecule is less stable than phenoxide ion because
   a) phenol resonance structures have charge separation but not in phenoxide ion.
   b) phenoxide ion resonance structures have charge separation but not in phenol.
   c) both phenoxide ion and phenol resonance structures have charge separation
   d) both phenoxide ion and phenol resonance structures do not have charge separation.

9. In fermentation by zymase, alcohol and CO_2 are obtained from
   (a)Invert sugar   (b) Glucose   (c)Fructose   (d)All

10. Which of the following compound gives a ketone with Grignard reagent
    (a)Formaldehyde   (b)Ethyl alcohol   (c)Methyl cyanide   (d)Methyl iodide

11. Which acid has least pK_a value
    (a) Cl_3CCOOH (b) $Cl_2CHCOOH$ (c) $ClCH_2COOH$ (d) CH_3COOH

12. Amines behave as

    (a)Lewis acids   (b)Lewis bases
    (c)Aprotic acids   (d)Amphoteric compounds

13. The order of basic strength among the following amines in aqueous solution is
    (a) $CH_3NH_2 > (CH_3)_3N > (CH_3)_2NH$ (b) $(CH_3)_2NH > CH_3NH_2 > (CH_3)_3N$
    (c) $(CH_3)_3N > CH_3NH_2 > (CH_3)_2NH$ (d) $CH_3NH_2 > (CH_3)_2NH > (CH_3)_3N$

14. The purine base present in DNA is
    (a) Adenine   (b)Cytosine   (c)Uracil   (d)Thymie

15. Vitamin which plays a vital role in the coagulating property of blood is
    (a) Vitamin A (b)Vitamin$D$ (c) Vitamin E (d) Vitamin K

II. Fill in the blanks by choosing the appropriate word from those given in the brackets: 5 × 1 = 05

(lanthanoid contraction , first, carbylamine, negative, positive)

16. The type of deviation shown by minimum boiling azeotropes at specific composition towards Raoult's law_____
17. Inversion of cane sugar is example of_____reaction.
18. Zr and Hf have almost equal atomic and ionic radii due to…………
19.-------------derivatives of methane and ethane are called freons.
20.------------- is obtained when primary amine is heated with chloroform with alcoholic potash.

PART-B

III. Answer any three of the following. Each question carries two marks.

3 × 2 = 06

21. Define Vant Hoff's factor? What is the conclusion drawn when Vant Hoff's factor of a solution is less than one?
22. Write any two differences between order and molecularity of a reaction.
23. What are ambidentate ligands? Give example.
24. How do you prepare alkyl fluoride from alkyl chloride? Write the general reaction for the same.
25. Explain aldol condensation reaction with sutiable example.
26. Give any two difference between starch and cellulose.

Part-C

IV. Answer any three of the following. Each question carries three marks.

3 × 3 = 09

27. Calculate the spin only magnetic moment of Fe^{+2} (atomic number 26).
28. Explain the manufacture of Potassium dichromate from chromite ore with balanced reaction.
29. a) 3d Transition metals and their compounds are good catalysts. Give two reasons?
    b) Name the metals present in Brass alloy.
30. Using VBT explain, Geometry, type of hybridization and magnetic properties of the complex ion $[CoF_6]^{3-}$
31. a) Draw the structures of cis -trans isomers for $[Pt (NH_3)_2Cl_2]$.
    b) How many ions are produced from the aqueous solution of complex $K_3[Al(C_2O_4)_3]$.
32. a) Draw the energy level diagram for the crystal field splitting in octahedral complexes.
    b) What is spectrochemical series?

V. Answer any two of the following. Each question carries three marks.

2 × 3 = 06

33. Write any three differences between ideal and non-ideal solutions.
34. State Kohlrausch's law of independent migration of ions. Mention two applications of it.
35. What is corrosion? Mention two general methods for prevention of corrosion.
36. Derive integrated rate equation for first order gas reaction.

Part- D

VI. *Answer any four of the following. Each question carries five marks.*

$4 \times 5 = 20$

37. i) $CH_3CH(Br)CH_2CH_2CH_3 + KOH_{(alc)}$-----------> A + B.
     Predict A and B.
     ii) State the rule used to predict the major product in the above reaction.
     iii) Explain Wurtz-Fittig's reaction with sutiable example.
     (2+2+1)

38. i) Write the three steps involved in the mechanism of acid catalyzed dehydration of ethanol to ethane.
     ii) What is Lucas reagent? Which class of alcohols does not readily form turbidity with Lucas reagent?
     (3+2)

39. i) Phenols are more acidic than alcohols. Justify.
     ii) Name the white precipitate obtained when phenol is treated with bromine water.
     How do you convert formaldehyde to ethanol. Explain with suitable chemical reaction.
     iii) $CH_3CH(OH)CH_3 \xrightarrow{\text{CrO}_3}$ A. Identify A .
     iv) How do you convert formaldehyde to ethanol. Explain with suitable chemical reaction.
     (1+1+1+2)

40. i) How benzene is converted into benzaldehyde by Gatterman- Koch reaction? Write equation.
     ii) Write the IUPAC name of CH_2=CH-CHO
     iii) Explain Cannizzaro's reaction with an example.
     (2+1+2)

41. i) Among formic acid and acetic acid, which is weaker acid and why?
     ii) Explain decarboxylation of sodium benzoate.
     iii) What is Formalin solution?
     (2+2+1)

42. i) Explain Hoffmann bromamide degradation for the preparation of Aniline.
     ii) How do you convert a diazonium salt solution into iodobenzene? Give equation.
     iii) Why aromatic primary amines cannot be prepared by Garbriel synthesis?
     (2+2+1)

43. i) Write Haworth's structure for maltose.
     ii)What is meant by denaturation of protein? Which level of structure remains intact during denaturation of globular protein?
     iii) Name the base present only in DNA but not in RNA
     (2+2+1)

PART – E (PROBLEMS)

VII. Answer any three of the following. Each question carries three marks.
     $3 \times 3 = 09$

44. 5.8g of a non volatile solute was dissolved in100g of carbon disulphide(CS_2). The vapour pressure of the solution was found to be 190 mm.of Hg. Calculate the molar mass of the solute given the vapour pressure of pure CS_2 is 195 mm.of Hg. [Molar mass of CS_2= 76 gmol^{-1}]

45. 300 cm^3 of an aqueous solution of a protein contains 2.12 g of the protein, the osmotic pressure of

such a solution at 300K is found to be 3.89 x 10^{-3} bar. Calculate the molar mass of the protein. (R= 0.0823 L bar mol^{-1} K^{-1}.)

46. Calculate the emf of the cell in which the following reaction.

   Mg(s) + 2Ag^+(aq) $\longrightarrow$ Mg^{2+}(aq) +2 Ag(s)

   Given: E^o(Mg^{2+}/ Mg)= -2.37 , E^o(Ag^+/Ag)=0.80 V,[Mg^{2+}]=0.001M; [Ag^+]=0.0001M ,log 10^5=5

47. The resistance of 0.01M acetic acid solution is found to be 2220Ω, when measured in a cell has two electrodes of area of cross section 3.85cm^2 placed 10.5cm apart. Calculate conductivity.

48. For a first order reaction, the half-life period is 120 min. Calculate the time required to complete 90% of the reaction. The rate of reaction increases by 2 times when the temperature of the reaction raised from 300K to 310K. Calculate the energy of activation of the reaction.

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