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MODEL QUESTION PAPER

II PUC

2024

GOVERNMENT OF KARNATAKA

KARNATAKA SCHOOL EXAMINATION & ASSESSMENT BOARD

Class: II Year PUC **MODEL QUESTION PAPER** **Academic Year:** 2023-24

Subject: Chemistry (34) **Maximum Marks:**70

Time: 3.15hours **Number of questions:** 49

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 graphswherever necessary.
5. Direct answers to the numerical problems without detailed stepsand 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. Aquatic species are more comfortable in cold water rather than in warm water. This is due to
   a) solubility of oxygen is more in warm water.
   b) solubility of oxygen is more in cold water.
   c) solubility of gases increases with decrease of temperature.
   d) both (b) and (c).
2. Which of the following cell was used in Apollo space programme?
   a) Mercury cell b) Daniel cell c) H_2–O_2 Fuel cell d) Dry cell
3. During electrolysis of aqueous solution of NaCl, the reaction preferred at anode is
   a) $2H_2O(l) \rightarrow O_2(g) + 4H^+(aq) + 4e^-$ b) $H_2O(l) + e^- \rightarrow \frac{1}{2} H_2(g) + OH^-$
   c) $Cl^-(aq) \rightarrow \frac{1}{2} Cl_2(g) + e^-$ d) $\frac{1}{2} Cl_2(g) + e^- \rightarrow Cl^-(aq)$
4. Order of a reaction is determined by
   a) balanced chemical equation b) unbalanced chemical reaction
   c) experimental rate expression d) thermo-chemical equation
5. Ionic character decreases in the following oxides.
   a) $Mn_2O_7 > MnO_2 > MnO$ b) $MnO > MnO_2 > Mn_2O_7$
   c) $Mn_2O_7 > MnO > MnO_2$ d) $MnO > Mn_2O_7 > MnO_2$
6. The oxidation state of Fe in $[Fe(CO)_5]$ is
   a) + 2 b) 0 c) + 3 d) + 5
7. The gases liberated when primary alcohols react with thionyl chloride are
   a) SO_2 and H_2 b) $H_2$and HCl c) $SO_2$and HCl d) $NO_2$and H_2

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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. Glycerol is an example for

a) dihydric alcohol b) dihydric phenol c) trihydric phenol d) trihydric alcohol

10. Tollen's reagent is a

a) silver nitrate solution b) ammonical silver nitrate solution

c) ammonium nitrate solution d) silver chloride solution

11. Carboxylic acids exists in dimeric form even in vapour phase due to

a) Hydrogen bond b) peptide bond c) ionic bond d) metallic bond

12. The state of hybridization of orbitals of Nitrogen atom in amines is;

a) sp^2 b) sp^3 c) sp d) dsp^2

13.Benzene diazonium chloride reacts with phenol to form p-hydroxy azobenzene in

a) acidic medium b) neutral medium

c) basic medium d) both acidic and neutral medium

14. Thiamine is a chemical name of;

a) Vitamin A b) Vitamin B_1 c) Vitamin C d) Vitamin K

15. The nitrogenous base adenine form hydrogen bonding with

a) Thymine b) Cytosine c) Guanine d) None of the above

II. Fill in the blanks by choosing the appropriate word from those given in the brackets:

(phosgene, tin, hydrogen, molecularity, zinc, cellulose acetate) **5 × 1 = 05**

16. Thesemi permeable membrane used in the reverse osmosis is _____.

17. The number of molecules taking part in the elementary reaction is called _____.

18. The non-transitional metal present in brass is _____.

19. The poisonous gas formed when chloroform is exposed to air and lightis _____.

20. Solubility of ethylamine in water is due to formation of _____bonding with water.

PART - B

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

21. How does theboiling point of solvent varies, when a non-volatile solute is dissolved in it? Give reason.

22. Define order of a reaction. For which order reaction the unit of rate of reaction and rate constant is same?

23. What are chelate ligands? Give an example.

24. Write the general equation for Finkelstein reaction. What is the role of dry acetone in this reaction?

25. Complete the equation and name the reaction: $R-\overset{\overset{O}{\|}}{C}-CH_3 \xrightarrow{NaOX}$

26. Name two hormones which regulate the glucose level in the blood.

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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 $M^{3+}_{(aq)}$ion. (Z = 24)

28. Explain the structure of dichromate ion ($Cr_2O_7^{2-}$).

29. What is Lanthanoid contraction? Mention two of its consequences.

30. Write the IUPAC names and thetype of isomerism forthefollowing complexes

    (a) $[Co(NH_3)_5Br]SO_4$ and (b) $[Co(NH_3)_5SO_4]Br$.

31. Using Valence Bond Theory [VBT], explain geometry, hybridisation and magnetic property of $[CoF_6]^{-3}$ ion. [Atomic number of Cobalt is 27].

32. Drawthe energy level diagram for the crystal field splitting in tetrahedral complexes. Write the relation between Δ_0 and Δ_t for the complexes having same metal, the same ligand and metal-ligand distances.

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. Explain the experimental determination of conductance of electrolytic solution by using Wheatstone bridge.

36. Derive integrated rate equation forfirst order gas phase reaction.

PART - D

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

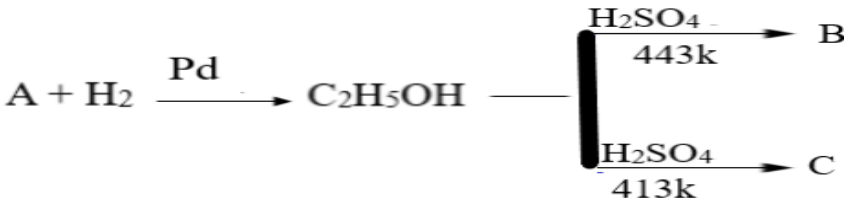
37. a.Write the mechanism involved in the following reaction:

$$(CH_3)_3CBr + OH^- \rightarrow (CH_3)_3COH + Br^-$$

Identify the reactant on which rate of reaction depends.

b. Define stereocenter? How many asymmetric carbon atoms are there in 2, 3-dichlorobutane?(3+2)

38. a.Identify A, B and C in the following reaction:



b. Describe the manufacture of methanol from water gas. (3+2)

39. a. An aromatic hydrocarbon 'A' having molecular formula C_9H_{12} is oxidised in the presence of air gives compound 'B'. The compound 'B' is treated with dilute acid gives two organic compounds 'C' and 'D'. The compound 'C' forms white precipitate 'E' with bromine water. Write the chemical reactions with names of A, B, C and E.

b. Give an example for unsymmetrical (mixed) ether. (4+1)

40. a. Write the chemical equation for the reaction whenbenzaldehyde is slightly heated with acetophenone in the presence of dilute alkali. Give the IUPAC name of the product.

b. Explain Rosenmund reduction with an example.

c. Alpha (α) -Hydrogens of aldehydes and ketones are acidic. Give reason. (2+2+1)

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41. a. A Grignard reagent 'X' reacts with CO_2 (dry ice) followed by acid hydrolysis gives ethanoic acid. Write the chemical equation. Namethe compound 'X'?

b.Between methanoic acid and ethanoic acid, which is more acidic? Give reason. (3+2)

42. a.Write the chemical name and structure of Hinsberg's reagent. 3°- amines do not react with Hinsberg's reagent. Give reason.

b.Explain Carbylamine reaction with an example. (3+2)

43. a.(i)The penta-acetate of glucose does not react with Hydroxylamine. What does it indicate?

(ii) Write chemical reaction to show the open chain structure of D-glucose which contains six carbon atom the straight chain.

b. What is Zwitter ion of an amino acid? Give its general structure.

c. Name the hormone responsible for the hypothyroidism? (2+2+1)

PART – E (PROBLEMS)

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

44. 100 g of liquid 'A' (molar mass 140 $gmol^{-1}$)was dissolved in 1000 g of liquid 'B' (molar mass 180 $gmol^{-1}$).The vapour pressure of liquid 'B' was found to be 500 torr. Calculate the vapour pressure of pure liquid 'A' if the total vapor pressure of the solution is 475 torr.

45. The boiling point of benzene is 353.23K. When 1.8g of non-volatile solute was dissolved in 90g of benzene, the boiling point is raised to 354.11K. Calculate the molar mass of the solute. (Given K_b for benzene is 2.53K$kgmol^{-1}$).

46. At 298K, the EMF of the cell: Mg(s) $|Mg^{2+}(Q)||Ag^{+}(0.01)|$Ag(s)is 3.022V. Calculate the value 'Q'. (Given: $E^{o}_{Mg2+/Mg}$ = -2.37V and $E^{o}_{Ag+/Ag}$ = 0.80V)

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

48. For a first order reaction, the half-life period is 120 min. Calculate the time required to complete 90% of the reaction.

49. The rate constants of a reaction are $2 \times 10^{-2} s^{-1}$ at 300K and $8 \times 10^{-2}\ s^{-1}$ at 320 K. Calculate the energy of activation of the reaction. (Given: R = 8.314$JK^{-1}mol^{-1}$).

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