

SHARADA P.U COLLEGE, MANGALURU

I PUC – CHEMISTRY- MODEL PAPER

MAX. MARKS: 70

Time: 3 Hr

PART - A

I. Answer ALL of the following:

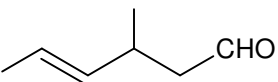
1 x 10 = 10

1. Write number of moles present in 1 kg of water.
2. Mention the type of intermolecular attraction that exist between HCl molecules
3. What are Lewis bases.
4. Na^+ ion has smaller radius than Na atom. Give reason.
5. Identify the type of redox reaction.
 $\text{Cl}_2 + 2\text{NaOH} \rightarrow \text{NaCl} + \text{NaOCl} + \text{H}_2\text{O}$.
6. Name product formed when potassium is heated with oxygen.
7. What is the hybridisation of carbon in graphite.
8. Complete the equation, $\text{Na}_2\text{B}_4\text{O}_7 \xrightarrow[\text{Strongly}]{\text{Heat}}$
9. What is homologous series.
10. Draw the Sawhorse eclipsed conformation of ethane.

PART - B

II. Answer any FIVE of the following:

2 x 5 = 10

11. 1.2 g of Mg is burnt in 1.4 g of sulphur to form magnesium sulphide. Calculate the mass of MgS formed.
12. a) State Charle's law
b) Write Vander-Waals equation for 1 mol of real gas.
13. What is hydrogen bond. Give example for intramolecular H-bonding.
14. Explain the manufacture of NaOH by Caster-Kellner cell.
15. What are starting material for the preparation of silicon polymer? Write the partial structure of this polymer.
16. Write the IUPAC name of
a) $\text{CH}_3-\underset{\text{OH}}{\text{CH}}-\text{CH}_2-\text{CH}_2-\text{CN}$ b) 
17. Give equation with reaction conditions for the conversion of
a) Bromo-ethane to ethene
b) Ethyne to benzene
18. What is a) Green house effect b) Photochemical smog.

PART - C

III. Answer any FIVE of the following:

3 x 5 = 15

19. a) Define electron gain enthalpy and name the element with highest negative value of electron gain enthalpy
b) Write the IUPAC name of the element with atomic number 107. (2 + 1)
20. Write electronic configuration, calculate bond order and explain magnetic properties of oxygen molecule.
21. Explain bonding and geometrical shape of ethene molecule by using hybridisation.
22. a) Write Lewis electron structure of carbonate ion.
b) Compare the dipole moment of NH_3 with NF_3 . Give reason for difference. (1 + 2)
23. Balance the Redox reaction using oxidation number method.
 $\text{MnO}_4^- \text{(aq)} + \text{I}^- \text{(aq)} \rightarrow \text{MnO}_2 \text{(s)} + \text{IO}_3^- \text{(aq)}$ (In basic medium)
24. a) Explain synthetic resin method for softening of hard water
b) Complete the equation, $\text{C}_{(s)} + \text{H}_2\text{O}_{(g)} \xrightarrow{\text{Ni}/1273\text{K}}$. (2 + 1)
25. a) Explain any two chemical reaction to prove the diagonal relationship between Li and Mg.
b) Write the chemical composition of plaster of Paris. (2 + 1)

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26. a) Write equation for Laboratory preparation of
 1. Diborane
 2. Carbon dioxide gas
 b) Give reason, common oxidation state for Thallium (Tl) is +1 in group 13.

PART - D

IV. Answer any FIVE of the following:

5 x 5 = 25

27. a) Define law of multiple proportion
 b) Calculate the molarity of the solution produced by dissolving 2g of NaOH in 250 ml of solution
 c) A hydrocarbon contains 92.3% of carbon. Calculate its empirical formula
(1 + 1 + 2)
28. a) Write the significance of Azimuthal and Magnetic quantum number
 b) Calculate the wave number of the spectral line of shortest wavelength appearing in the Paschen series of H-spectrum ($R = 1.09 \times 10^7 \text{ m}^{-1}$)
 c) Write the number of unpaired electrons in Fe^{3+} ion.
(2 + 2 + 1)
29. a) Write the observations of Rutherford's gold leaf experiment
 b) Write the value of n and ℓ for an electron in 3d subshell.
 c) Write any two limitation of Bohr's atomic model
(2 + 1 + 2)
30. a) Calculate the pressure in a mixture of 8g of $\text{O}_{2(g)}$ and 4g of $\text{H}_{2(g)}$ confined in a vessel of 2L at 27°C ($R = 0.083 \text{ L bar K}^{-1} \text{ mol}^{-1}$)
 b) Write the two postulates of Kinetic theory of gaseous which are not obeyed by real gases.
 c) Define coefficient of viscosity
(2 + 2 + 1)
31. a) State Hess's law of constant heat summation and explain with example.
 b) 5 mol of an ideal gas at 27°C undergoes isothermal expansion reversibly from a volume of 10 L to a volume of 50 L. Calculate the work done by the gas. **(3 + 2)**
32. a) Calculate enthalpy of combustion of ethanol. Given enthalpy of formation of ethanol, water and carbon dioxide are -278 kJ mol^{-1} , -286 kJ mol^{-1} and $-393.5 \text{ kJ mol}^{-1}$ respectively.
 b) Draw Born-Haber's cyclic representation for the calculation of Lattice enthalpy of NaCl crystal.
 c) Write the relationship between standard free energy change and equilibrium constant
(2 + 2 + 1)
33. a) Explain common ion effect with an example.
 b) For the reaction $\text{N}_2 + 3\text{H}_2 \rightleftharpoons 2\text{NH}_3$ at 773 K, the value of $K_p = 1.4 \times 10^{-15}$. Calculate K_c (Given $R = 8.314 \text{ JK}^{-1} \text{ mol}^{-1}$)
 c) Write the conjugate acid of CO_3^{2-}
(2 + 2 + 1)
34. a) Explain the effect of temperature and pressure on the equilibrium
 $2\text{NO}_{2(g)} \rightleftharpoons \text{N}_2\text{O}_{4(g)}$ $\Delta H = -57 \text{ kJ mol}^{-1}$.
 b) Calculate the pH of 0.001 M acetic acid if it is dissociated to an extent of 4% in aqueous solution at 298 K.
 c) Write the solubility product expression for $\text{Al}_2(\text{SO}_4)_3$ in its saturated solution
(2 + 2 + 1)

V. Answer any TWO of the following:

5 x 2 = 10

35. a) Explain the estimation of halogen by Carius method with calculation steps
 b) Explain +E effect with an example
(3 + 2)
36. a) Give the Lassigne's test for the detection of nitrogen
 b) Explain functional isomerism with example.
 c) Write application of chromatography
(2 + 2 + 1)
37. a) Explain mechanism of nitration of benzene.
 b) State Markownikoff's rule and name the major product when propene is treated with HBr
(3 + 2)
