

I – PUC – CHEMISTRY (34)
MODEL QUESTION PAPER -1
For reduced syllabus 2020-21

Time: 3 hours 15 minutes

Maximum Marks: 70

Instructions:

1. The question paper has four parts: A, B, C and D. All parts are compulsory.
2. Write balanced chemical equations and draw labelled diagrams wherever required.
3. Use log tables and the simple calculators if necessary. **(Use of Scientific Calculator is not allowed)**

PART- A

I. ANSWER ALL THE QUESTIONS. EACH QUESTION CARRIES 1 MARK. 10×1 = 10
(Answer each question in one word or one sentence)

1. 'Cisplatin' a medicine used in the treatment of which disease?
2. Write the mathematical expression for Boyle's law.
3. Give an example for gaseous reversible reaction for which $K_p = K_c$
4. Which group elements in the periodic table are called as noble gases?
5. What is the oxidation number of the element in its free state?
6. Write the general electronic configuration of first group elements.
7. Diamond is covalent, yet it has high melting point. Why?
8. Write the dimeric structure of $AlCl_3$.
9. Give an example for non-benzenoid compound.
10. Write a chemical reaction to show acidic nature of acetylene.

PART- B

II. ANSWER ANY FIVE OF THE FOLLOWING. EACH QUESTION CARRIES 2 MARKS. 5×2= 10

11. Convert $37^{\circ}C$ to $^{\circ}F$.
12. Under what conditions of temperature and pressure real gases tend to behave ideally?
13. What is dipole moment? What is its SI unit?
14. Write any two diagonal relationships between Beryllium and Aluminium.
15. Give the composition of (a) Water gas (b) Producer gas.
16. How is chloromethane converted into ethane?
17. Illustrate Markovnikov's rule with an example.
18. Explain decarboxylation of sodium benzoate with chemical equation.

PART- C

III. ANSWER ANY FIVE OF THE FOLLOWING. EACH QUESTION CARRIES 3MARKS. 5×3= 15

19. i) Give reason: Ionic radius of F^{-} (fluoride ion) is more than atomic radius of F (fluorine atom).
- ii) How does ionization enthalpy varies down the group?
- iii) Ionization enthalpy of nitrogen is more than that of oxygen. Give reason. 1+1+1

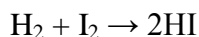
20. With the help of MOT; write the energy level diagram of hydrogen molecule. What is its bond order and predict its magnetic property? 3
21. Calculate the formal charge of each oxygen atom of ozone molecule. 3
22. a) Give any two differences between sigma and pi bonds.
b) What is the magnetic nature of oxygen molecule on the basis of MOT? 2+1
23. Balance the following redox reaction by oxidation number method. 3
- $$\text{MnO}_2 + \text{Br}^- \rightarrow \text{Mn}^{2+} + \text{Br}_2 + \text{H}_2\text{O} \text{ (Acid medium)}$$
24. i) Explain softening of permanent hardness of water by Calgon's process.
ii) Give an example of ionic hydride. 2+1
25. Give any three differences between lithium and other alkali metals. 3
26. Give any three anomalous properties of carbon. 3

PART –D

IV. ANSWER ANY FIVE OF THE FOLLOWING. EACH QUESTION CARRIES 5MARKS. 5×5=25

27. a) Determine the molecular formula of an oxide of iron in which the mass percent of iron and oxygen are 69.9 and 30.1 respectively. Given that the molar mass of oxide is 159.8 g mol^{-1} . (Atomic mass of iron & oxygen are 55.85u & 16u respectively)
b) Define a mole. 4+1
28. a) Write the significance of quantum numbers n, l & m.
b) State Pauli's exclusion principle.
c) Write the electronic configuration of copper (Z = 29). 3+1+1
29. a) The FM station of All India Radio, Hassan, broadcast on a frequency of 1020 kilohertz. Calculate the wavelength of the electromagnetic radiation emitted by transmitter.
b) Calculate the maximum number of electrons present in third main energy level? 3+2
30. a) Give any three postulates of kinetic molecular theory of gases.
b) On a ship sailing in Pacific Ocean where temperature is 23.40°C , a balloon is filled with 2L air. What will be the volume of the balloon when the ship reaches Indian Ocean where temperature is 26.1°C ? 3+2
31. a) The combustion of one mole benzene takes place at 298K and 1 atm. After combustion, $\text{CO}_{2(g)}$ and $\text{H}_2\text{O}_{(l)}$ are produced and 3267.0kJ of heat is liberated. Calculate the standard enthalpy of formation of benzene. Given: Standard enthalpy of formation of $\text{CO}_{2(g)}$ and $\text{H}_2\text{O}_{(l)}$ are $-393.5 \text{ kJ mol}^{-1}$ and $-285.0 \text{ kJ mol}^{-1}$ respectively.
b) Write the mathematical expression for First law of thermodynamics.
c) Give an example for isolated system. 3+1+1
32. What is lattice enthalpy? Calculate the lattice enthalpy of sodium chloride by using Born-Haber cycle. 5

33. a) The following concentrations were obtained for the formation of NH_3 from N_2 and H_2 at equilibrium at 500K. $[\text{N}_2]=1.5 \times 10^{-2}\text{M}$, $[\text{H}_2] = 3.0 \times 10^{-2}\text{M}$ and $[\text{NH}_3] = 1.2 \times 10^{-2}\text{M}$. Calculate the equilibrium constant.
- b) Define common ion effect?
- c) Write the relation between solubility and solubility product (K_{sp}) for AB_2 type of salt. 3+1+1
34. a) Define an acid and base according to Arrhenius concept?
- b) Give an example for (i) solid-vapour equilibrium (ii) liquid-vapour equilibrium
- c) Write the expression for equilibrium constant (K_c) for the equilibrium reaction:



2+2+1

V. ANSWER ANY TWO OF THE FOLLOWING. EACH QUESTION CARRIES 5MARKS. 2×5=10

35. a) For the molecule $\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$
- i) Identify functional group.
- ii) Write the bond line formula.
- iii) Write the succeeding homologue.
- b) Explain inductive effect with a suitable example. 3+2
36. a) i) Give any two differences between inductive effect and electromeric effect.
- ii) Explain position isomerism with an example.
- b) What are nucleophiles? 4+1
37. a) Explain the mechanism of nitration of benzene.
- b) Write the Newman's projections of ethane. 3+2