Sl No _____ (To be filled in by the candidate) **(Academic Sessions 2020 – 2022 to 2023 – 2025)**

CHEMISTRY 224-1st Annual-(INTER PART – I) Time Allowed : 20 Minutes

Q.PAPER – I (Objective Type) GROUP – II Maximum Marks : 17

PAPER CODE = 6484 LHR-2-24

Note : Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink in the answer-book. Cutting or filling two or more circles will result in zero mark in that question.

1-1	The gases show more deviation from ideal behaviour at : (A) Low temperature and high pressure (B) High temperature and low pressure (C) High temperature and high pressure (D) Low temperature and low pressure
2	The wave number of the light emitted by a certain source is $2\times10^{6}m^{-1}$. The wavelength of this light will be : (A) 200 nm (B) 500 m (C) 500 nm (D) $5\times10^{7}m$
3	The equilibrium constant for the reaction $2O_3 \rightleftharpoons 3O_2$ is 10^{55} at 25 °C. It tells us that at room temperature : (A) O_3 is unstable and decomposes rapidly (B) O_3 is highly stable and decomposes slowly (C) O_3 is unstable and decomposes slowly (D) O_3 is highly stable and decomposes rapidly
4	The main function of a catalyst in a chemical reaction is to : (A) Increase Ea (B) Decrease temperature (C) Decrease Ea (D) Decrease pressure
5	49 g of aqueous solution of H_2SO_4 contains moles of H^+ ions : (A) 1.0 (B) 0.2 (C) 0.4 (D) 0.01
6	Which of the following molecule has zero dipole moment : (A) H_2S (B) SO_2 (C) CO (D) CS_2
7	Solvent extraction is an equilibrium process and it is controlled by : (A) Law of mass action (B) Distribution law (C) The amount of solute (D) The amount of solvent used
8	The geometry of PH_3 is : (A) Bent (B) Trigonal planar (C) Tetrahedral (D) Trigonal pyramidal
9	Stronger the oxidizing agent, greater is the : (A) Oxidation potential (B) Reduction potential (C) Redox potential (D) emf of cell
10	Which type of intermolecular forces are present in chloroform : (A) Hydrogen bonding (B) Dipole-dipole forces (C) London forces (D) Dipole-induced forces
11	One mole of CO_2 contains : (A) 6.02×10^{23} atoms of oxygen (B) 18.1×10^{23} molecules of CO_2 (C) 6.02×10^{23} atoms of carbon (D) 22 gram atoms of CO_2
12	The solid iodine is the best example of : (A) Ionic solids (B) Covalent solids (C) Metallic solids (D) Molecular solids
13	The order of the rate of diffusion of gases NH_3 , SO_2 , $C\ell_2$ and CO_2 is : (A) $NH_3 > SO_2 > C\ell_2 > CO_2$ (B) $NH_3 > CO_2 > SO_2 > C\ell_2$ (C) $C\ell_2 > SO_2 > CO_2 > NH_3$ (D) $NH_3 > CO_2 > C\ell_2 > SO_2$
14	Quantum number values for 2p orbitals are : (A) $n = 2, \ell = 1$ (B) $n = 1, \ell = 2$ (C) $n = 1, \ell = 0$ (D) $n = 2, \ell = 0$
15	Which of the following substance is used as drying agent in desiccator : (A) NaCℓ (B) Animal Charcoal (C) $NH_4C\ell$ (D) Anhydrous $CaC\ell_2$
16	At constant volume, q_v is equal to : (A) ΔH (B) ΔE (C) ΔP (D) ΔV
17	18 g glucose is dissolved in 90 g of water. The relative lowering of vapour pressure is equal to : (A) 1/5 (B) 5.1 (C) 1/51 (D) 6

Roll No _____ (To be filled in by the candidate) **(Academic Sessions 2020 – 2022 to 2023 – 2025)**

CHEMISTRY 224-1st Annual-(INTER PART – I) Time Allowed : 2.40 hours

PAPER – I (Essay Type) GROUP – II Maximum Marks : 68

LHR-2-24

SECTION – I

2. Write short answers to any EIGHT (8) questions : **16**

(i) What are molecular ions, give two examples?

(ii) Define stoichiometry.

(iii) What is importance of limiting reactant?

(iv) Why is sintered glass crucible superior than Gooch Crucible?

(v) What is solvent extraction?

(vi) Write quantitative statement of Charles's law.

(vii) Differentiate between quantitative and qualitative analysis.

(viii) What is compressibility factor, write its value for an ideal gas?

(ix) Write two characteristics of plasma.

(x) Differentiate between equilibrium constant " K_c " and chemical equilibrium.

(xi) Derive expression of K_c for $NH_3(g)$ synthesis by Hyber process.

(xii) Define pH and pOH.

3. Write short answers to any EIGHT (8) questions : **16**

(i) Ionic crystals are highly brittle. Explain with reason.

(ii) HF is the weakest acid among all halogen acids. Why?

(iii) Differentiate between crystalline and amorphous solids.

(iv) Evaporation takes place at all temperatures. Explain with reason.

(v) How neutron decays? Give reaction.

(vi) What is atomic emission spectrum? Explain.

(vii) Give importance of Moseley's law. (Any two)

(viii) State ($n + \ell$) rule. Give its importance.

(ix) What do you mean by the term activation of a catalyst? Give example.

(x) Define order of reaction by giving example.

(xi) What do you mean by water of crystallization? Give two examples.

(xii) Define mole fraction in solutions by giving one example.

4. Write short answers to any SIX (6) questions : **12**

(i) Bond distance is a compromised distance between two atoms. Justify the statement.

(ii) Sketch the hybrid orbitals of : (i) $PC\ell_3$ (ii) NH_4^+

4. (iii) Define bond energy. What are factors influencing bond energy?

(iv) Why is sigma (σ) bond stronger than pi (π) bond?

(v) Define lattice energy. Give one example.

(vi) How do you determine ΔH for food and fuel in laboratory?

(vii) Define Hess's law of constant heat summation.

(viii) Na & K can displace hydrogen from acids but Pt, Pd and Cu can not. Why?

(ix) Give the reactions taking place in silver oxide battery.

SECTION – II

Note : Attempt any THREE questions.

5. (a) Explain evidence of atom in detail. 4

(b) Define metallic solids. Discuss metallic solids in terms of electron gas theory and molecular orbital theory. 1,3

6. (a) What pressure is exerted by a mixture of 2.00 g of H_2 and 8.00 g of N_2 at 273 K in a 10 dm^3 vessel? 4

(b) Explain J.J Thomson's experiment for determination e/m value of electron. 4

7. (a) Define hybridization. Explain sp hybridization by taking example of ethyne. 1,3

(b) Calculate the pH of a buffer solution in which 0.11 molar CH_3COONa and 0.09 molar acetic acid solution are present K_a for CH_3COOH is 1.85×10^{-5}. 4

8. (a) Define the following with suitable example : 2,2
(i) Enthalpy of neutralization. (ii) Enthalpy of formation.

(b) Define oxidation number. Also write rules for assigning oxidation number. 1,3

9. (a) How boiling point elevation is measured by Landsberger's method? 4

(b) Differentiate between homogeneous catalysis and heterogeneous catalysis with one example of each. 2,2