

Roll No \_\_\_\_\_ (To be filled in by the candidate) (Academic Sessions 2020 – 2022 to 2023 – 2025 )  
CHEMISTRY 224-1<sup>st</sup> Annual-(INTER PART – I) Time Allowed : 2.40 hours  
PAPER – I ( Essay Type ) GROUP – II Maximum Marks : 68

SECTION – I

LHR-2-24

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  $(n + l)$  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 :

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- (i) Bond distance is a compromised distance between two atoms. Justify the statement.
- (ii) Sketch the hybrid orbitals of : (i)  $PCl_3$  (ii)  $NH_4^+$

(Turn Over)

(2)

4. (iii) Define bond energy. What are factors influencing bond energy?
- (iv) Why is sigma ( $\sigma$ ) bond stronger than pi ( $\pi$ ) bond?
- (v) Define lattice energy. Give one example.
- (vi) How do you determine  $\Delta H$  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  $10\text{ dm}^3$  vessel? 4
- (b) Explain JJ 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  $1.85 \times 10^{-5}$ . 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

132-224-II-(Essay Type) – 25000