

B.Sc. (Part-I) Semester—II Examination
CHEMISTRY

Time : Three Hours]

[Maximum Marks : 80

Note :— (1) All questions are compulsory.

(2) Question No. 1 carries 8 marks, while each of the remaining six questions carries 12 marks.

(3) Draw diagram and write equations wherever necessary.

(4) Use of scientific calculator is allowed.

1. (A) Fill in the blanks :

- (i) The total number of atoms or molecules whose concentration determines the rate of a reaction is called as _____.
- (ii) The type of hybridization in ClF_3 molecule is _____.
- (iii) The unit of rate constant for a second order reaction is _____.
- (iv) In chlorobenzene, chlorine atom is bonded to _____ hybridized carbon atom of the benzene ring.

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(B) Choose the correct alternative :

(i) The outer shell electronic configuration of 17th (VII A) group elements is :

- (a) $ns^2 np^3$
- (b) $ns^2 np^1$
- (c) $ns^2 np^5$
- (d) $ns^2 np^2$

(ii) Dihydric alcohols are known as :

- (a) diols
- (b) triol
- (c) geraniols
- (d) none of the above

(iii) The shape of PCl_5 molecule is :

- (a) V shape
- (b) Trigonal bipyranidal
- (c) T shape
- (d) Tetrahedral

(iv) The dipole moment of CO_2 molecules is :

- (a) +ve
- (b) zero
- (c) +ve and -ve
- (d) none of these

 $\frac{1}{2} \times 4 = 2$



(C) Answer in **one** sentence each :

- (i) What is pseudo unimolecular reaction ?
- (ii) What are epoxides ?
- (iii) What are non polar solvents ?
- (iv) What is the IUPAC name of $\text{CH}_3\text{-CH}_2\text{-CH}_2\text{-O-CH}_2\text{-CH}_3$? 1×4=4

UNIT—I

- 2. (A) Explain LUX-Flood concept of acid and base with suitable example. 4
- (B) What is Polarization ? Explain the Polarization of the anion by the cation. 4
- (C) What is SHAB Principle ? How is it useful to predict the stability of complex ? 4

OR

- 3. (P) Discuss the structure of IF_7 molecule. 4
- (Q) How charge and size of a cation affects Polarisation of anion ? Explain. 4
- (R) Explain :
 - (i) CaCl_2 is readily soluble but AgCl is sparingly soluble in water. 2
 - (ii) Melting point of CaCl_2 is higher than that of BaCl_2 . 2

UNIT—II

- 4. (A) Write the electronic configuration of oxygen family elements. 4
- (B) Explain the structure of XeO_4 molecule. 4
- (C) How are solvents classified on the basis of proton donating and accepting ability ? 4

OR

- 5. (P) Discuss structure and bonding in IF_7 molecule. 4
- (Q) Explain the structure of XeF_6 molecule. 4
- (R) Write any two reactions of liquid ammonia. 4

UNIT—III

- 6. (A) How will you prepare Benzyl chloride from :
 - (i) Toluene
 - (ii) Benzyl alcohol ? 4
- (B) How will you prepare :
 - (i) Ethylene glycol from ethylene ?
 - (ii) Trinitro glycerol from glycerol ? 4
- (C) How will you obtain glycerol from propene by chlorination ? 4

OR



7. (P) Explain the mechanism of Pinacol-Pinacolone rearrangement. 4
- (Q) Compare the reactivity of chlorobenzene and benzyl chloride towards the nucleophilic substitution reaction. 4
- (R) What happens when :
- (i) Allyl chloride reacts with Aq. KOH ?
- (ii) Acetylene gas passed through dil HCl at 433K in presence of Hg_2Cl_2 ? 4

UNIT—IV

8. (A) Give the following reaction of Phenol :
- (i) Kolbe's Reaction
- (ii) Fries Rearrangement. 4
- (B) Explain the ring opening reaction catalysed by acid. 4
- (C) What is action of cold and hot HI on diethyl ether ? 4

OR

9. (P) What are Phenols ? How Phenol is prepared from cumene ? 4
- (Q) Complete the following :
- (i) $\text{CH}_2=\text{CH}_2 + \text{R}-\overset{\text{O}}{\parallel}{\text{C}}-\text{OOH} \xrightarrow{\Delta} ?$
- (ii) $\text{CH}_3-\text{CH}_2-\text{Br} + \text{CH}_3-\text{CH}_2-\text{ONa} \xrightarrow{\Delta} ?$ 4
- (R) How will you prepare :
- (i) Diethyl ether from ethyl alcohol
- (ii) Styrene oxide from styrene ? 4

UNIT—V

10. (A) What are paramagnetic substance ? Give their characteristics. 4
- (B) Calculate number of unpaired electrons when magnetic moment is 4.9 B.M. 4
- (C) Discuss any two applications of dipole moment. 4

OR

11. (P) Describe the refraction method for the determination of dipole moment. 4
- (Q) Discuss Gouy's balance method for determination of molar magnetic susceptibility. 4
- (R) If the magnetic substance contains three unpaired electrons, calculate its magnetic moment. 4

12. (A) Define :

(i) Psuedo First Order Reaction

(ii) Molecularity.

4

(B) Define zero order reaction and give one example. What is the unit of zero order rate constant ?

4

(C) Describe the graphical method for determination of order of reaction.

4

OR

13. (P) Describe Van't Hoff's differential method for the determination of order of reaction.

4

(Q) Define :

(i) Order of reaction

(ii) Activation energy.

4

(R) For a given reaction at 25°C, rate constant doubles when temperature is increased by 10°C calculate the energy of activation for this reaction.

Given : $[R = 8.314 \text{ J K}^{-1} \text{ mol}^{-1}]$.

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