

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.

2

(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_3 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_3 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

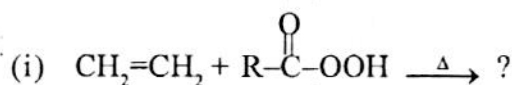
7. (P) Explain the mechanism of Pinacol-Pinacolone rearrangement. 4
- (Q) Compare the reactivity of chlorobenzene and benzyl chloride towards the nucleophilic substitution reaction. 4
- (R) What happens when :
- (i) Allyl chloride reacts with Aq. KOH ?
- (ii) Acetylene gas passed through dil HCl at 433K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



(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 : $[R = 8.314 \text{ Jk}^{-1} \text{ mol}^{-1}]$.

4