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 CIF_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 ½×4=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 $CH_3–CH_2–CH_2–O–CH_2–CH_3$? $1\times4=4$

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 form 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 calatysed 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) $CH_2=CH_2 + R-\overset{\overset{O}{\|}}{C}-OOH \xrightarrow{\Delta}$?

(ii) $CH_3-CH_2-Br + CH_3-CH_2-oNa \xrightarrow{\Delta}$? 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

UNIT—VI

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 detemination 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$Jk^{-1}mol^{-1}$]. 4