AS–1378

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

CHEMISTRY (New)

Time : Three Hours] [Maximum Marks : 80

N.B. :— (1) **ALL** questions are compulsory.

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

(3) Draw diagrams and write equation wherever necessary.

(4) Use of scientific calculator is allowed.

1. (A) Fill in the blanks :— ½×4=2

(i) _____ bond has directional characters.

(ii) The distortion of the symmetrical electrons charge cloud of an anion by the cation is called as _____.

(iii) Cyclic ether with a three membered ring is a _____.

(iv) The diamagnetic substance arrange _____ to magnetic field.

(B) Choose the correct alternative :— ½×4=2

(i) The amount of energy required to removing most loosely bonded electron from an isolated gaseous atom to form cation is known as _____.

(a) Electron affinity (b) Oxidation energy

(c) Ionisation energy (d) Oxidation potential

(ii) What is the shape of XeO_4 molecule ?

(a) Square planer (b) Pyramidal

(c) Tetrahedral (d) Linear

(iii) Chlorobenzene is an example of _____.

(a) Alkyl halide (b) Alkenyl halide

(c) Aryl halide (d) Haloalkane

(iv) The unit of magnetic moment is _____.

(a) Debye (b) Coulomb

(c) Bohr-Magneton (B.M.) (d) Dyne

(C) Answer in **ONE** sentence :— 1×4=4

(i) What is the geometry of XeF_4 molecule ?

(ii) What are phenols ?

(iii) What is hybridization of iodine in IF_7 ?

(iv) What is the unit of rate constant for zero order reaction ?

UNIT—I

2. (A) Explain :— 4

(i) Why melting point of NaCl is higher than that of CuCl ?

(ii) Why Ag^F is soluble in water whereas AgCl is not ?

(B) What is hybridisation ? What are the steps involved in hybridisation. 4

(C) What is SHAB principle ? Discuss its applications. 4

OR

3. (P) What is Polarisation ? How does polarisation affect the covalent characters of bond ? 4

(Q) What is the need of hybridisation ? Discuss the structure of SF_6 molecule on the basis of hybridisation. 4

(R) Explain Franklin's theory of acid and base with suitable examples. 4

UNIT—II

4. (A) Discuss the oxidation states of oxygen family. 4

(B) What are inter halogen compounds ? Give their types with suitable examples. 4

(C) What are non-aqueous solvents ? Classify them on the basis of proton donor acceptor behaviour. 4

OR

5. (P) Discuss the oxidising property of halogens. 4

(Q) Discuss the electronic configuration of oxygen family (16^{th} group). 4

(R) Explain the following reactions in liq. NH_3 :—

(i) Neutralisation reaction

(ii) Solvolysis reaction. 2×2=4

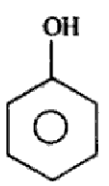
UNIT—III

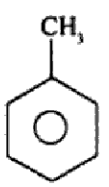
6. (A) How will you prepare :

(i) Vinyl chloride from acetylene

(ii) Allyl chloride from propene ? 2×2=4

(B) Complete the following reactions :

(i)  $+ PCl_5 \longrightarrow ? + ? + ?$

(ii)  $+ Cl_2 \xrightarrow[h\upsilon]{\Delta} ? + ?$ 2×2=4

(C) Explain the mechanism of Pinacol-Pinacolone rearrangement reaction. 4

OR

7. (P) Why chlorine in chlorobenzene is less reactive towards neucleophilic substitution than that in benzyl chloride ? 4

(Q) Explain Benzyne intermediate mechanism. 4

(R) How will you prepare :

(i) Ethylene glycol from ethylene chloride

(ii) 1, 2, 3–trichloropropane from glycerol. 2×2=4

UNIT—IV

8. (A) How phenol is obtained from :

(i) Cumene

(ii) Aniline ? 2×2=4

(B) How is diethyl ether obtained by :

(i) Continuous Etherification Process

(ii) Williamson's Synthesis ? 2×2=4

(C) Explain the ring opening reaction of styreneepoxide catalysed by alkali. 4

OR

9. (P) Explain :—

(i) Fries rearrangement reaction

(ii) Reimer-Tiemann reaction. 4

(Q) What happens when diethyl ether reacts with cold and hot HI. 4

(R) How will you obtain :

(i) Ethylene oxide from ethylene

(ii) Styrene oxide from styrene. 2×2=4

UNIT—V

10. (A) Discuss the effect of temperature on magnetic susceptibility of paramagnetic, diamagnetic ferromagnetic and anti-ferromagnetic substances. 4

(B) Differentiate between ferromagnetism and antiferromagnetism. 4

(C) Calculate the number of unpaired electrons, if the magnetic moment is 2.83 B.M. 4

OR

11. (P) Define the terms :—

(i) Dipole moment

(ii) Magnetic susceptibility. 4

(Q) Derive relationship between spin moment and number of unpaired electrons. 4

(R) Discuss any two applications of magnetic moments for molecular structure determination. 4

UNIT—VI

12. (A) Differentiate between order and molecularity. 4

(B) What is second order reaction ? Derive the equation for second order rate constant, when initial concentration of both reactants are equal. 4

(C) Describe graphical method for the determination of order of the reaction. 4

OR

13. (P) Define the terms :—

(i) Energy of activation

(ii) Zero order reaction. 4

(Q) In the hydrolysis of ethyl acetate using equal concentration of ester and NaOH, the following results were obtained :

Time (min)	0	5	15	25
Vol of HCl (ml)	16.00	10.24	6.13	4.32

Show that the reaction follows second order kinetics. 4

(R) Show the time for half change of first order reaction is constant. 4