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

2S : CHEMISTRY (New)

Time—Three Hours] [Maximum Marks—80

Note :— (1) All questions are compulsory.

(2) Question No. 1 carries 8 marks while each of the remaining 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 : 2

(i) The rate of reaction _____ on increase in the concentration of reactants.

(ii) The SI unit of Dipole moment is _____.

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

(iv) IUPAC name of Glycerol is _____.

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(B) Choose the correct alternative : 2

(i) The Fluorides of carbon are collectively known as :

(a) Fluorocarbons (b) Fullerenes

(c) Fluxinals (d) Pervoskites

(ii) The soft acid has one of the following oxidation states :

(a) Zero (b) Five

(c) Three (d) Seven

(iii) Decomposition of H_2O_2 is a reaction of :

(a) First order (b) Zero order

(c) Second order (d) Third order

(iv) The unit of magnetic moment is :

(a) Debye (b) Dyne

(c) Coulomb (d) Bohr Magneton

(C) Answer the following in **one** sentence : 4

(i) Define hard acid.

(ii) What is electron affinity ?

(iii) What is Benzyne ?

(iv) Define molecularity.

(C) A 20% solution of cane sugar is inverted by 0.5 N HCl at 25°C. The angle of rotation of cane sugar at various time intervals are given below, show that this is first order reaction :

Time (s)	0	72	368	460	680	∞
Rotation (degree)	+24.1	+21.4	+12.4	+10	+5.5	−10.7

5

OR

13. (P) Derive the integrated rate law equation for second order reaction with equal initial concentration of reactants. 4

(Q) Describe Van't Hoff's differential method for the determination of order of reaction. 4

(R) Discuss how Arrhenius equation is used to determine activation energy of the reaction. 4

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UNIT—V

10. (A) Define :

(i) Non-Polar molecules

(ii) Induced dipole moment. 4

(B) Describe Gouy's method to determine magnetic susceptibility. 4

(C) Differentiate between dimagnetism and paramagnetism. 4

OR

11. (P) Describe the Refraction method for the determination of dipole moment. 4

(Q) Differentiate between paramagnetic and diamagnetic substances. 4

(R) Define :

(i) Curie point

(ii) Neel point. 4

UNIT—VI

12. (A) Define zero order reaction and give one example. 3

(B) Derive integrated rate law equation for first order reaction. 4

UNIT—I

2. (A) Discuss the structure of SF_6 on the basis of hybridization. 4

(B) Explain Polarization of anion by cation. 4

(C) Explain why AgI_2 species is stable while AgF_2 is unstable. 4

OR

3. (P) What is dipole-dipole interaction ? How does dipole-dipole interaction affect the properties of substance ? 4

(Q) State and explain Pearson's HSAB principle. 4

(R) What is hybridization ? Explain the need of concept of hybridization. 4

UNIT—II

4. (A) Discuss the ionization energy of oxygen family elements. 4

(B) What are interhalogen compounds ? Discuss the structure of ClF_3. 4

(C) Explain Born-Haber cycle. 4

OR

5. (P) Discuss the electronic configuration of halogen family elements. 4

(Q) Explain the structure of XeF_6 molecule. 4

(R) Explain the merits and demerits of liquid ammonia as a solvent. 4

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UNIT—III

6. (A) How will you prepare chlorobenzene from :

(i) Benzene

(ii) BDC ? 4

(B) What happens when :

(i) allyl chloride is heated with alcoholic KOH

(ii) benzyl chloride is reacted with aq KOH ? 4

(C) Explain the benzyne intermediate mechanism (elimination-addition mechanism) of aromatic nucleophilic substitution. 4

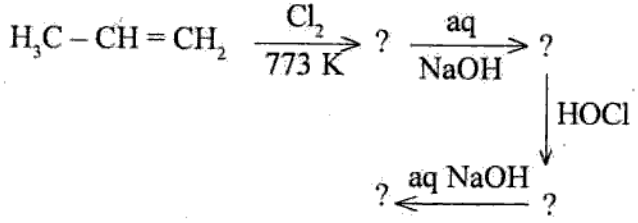
OR

7. (P) How will you prepare :

(i) aniline from chlorobenzene

(ii) acrolein from glycerol ? 4

(Q) Complete the following :



4

(R) Compare the reactivity of Chlorobenzene and benzyl chloride. 4

UNIT—IV

8. (A) Explain :

(i) Kolbe's Reaction

(ii) Williamson's synthesis. 4

(B) What happens when :

(i) Phenol is reacted with acetic anhydride

(ii) Styrene is reacted with peroxy acid ? 4

(C) Explain the acidic nature of Phenol. 4

OR

9. (P) Explain the ring opening reaction of epoxide catalysed by alkali. 4

(Q) Complete the following :

(i) $CH_2 = CH_2 + RCOOOH \xrightarrow{\Delta} ?$

(ii)

$CH_3 - CH_2 - O - CH_2 - CH_3 + HI \xrightarrow[373\,K]{} ?$

4

(R) Explain :

(i) Fries Rearrangement

(ii) Claisen Rearrangement. 4

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