AT–352

B.Sc. (Part—II) Semester—IV Examination
4S-CHEMISTRY

Time : Three Hours] [Maximum Marks : 80

Note :— (1) Question No. **1** is compulsory.
(2) Solve **ONE** question from each unit.
(3) Draw diagram and give equation wherever necessary.
(4) Use of calculator is allowed.

1. (A) Fill in the blanks :— 2

(i) Elements lying between s and p block elements are known as _____.

(ii) The pH at which the amino acids in the solution has zero charge is _____.

(iii) Unit cell of NaCl contains _____ molecules of NaCl.

(iv) The presence of solute _____ the boiling point of the solvent.

(B) Choose the correct option from the given alternatives :— 2

(i) Zinc exhibits _____ oxidation state.

(a) +1 (b) +2

(c) +3 (d) +4

(ii) Acetoacetic ester on reaction with urea gives _____.

(a) 4-methyl uracyl (b) Malonyl urea

(c) Thiourea (d) Methyl urea

(iii) Aniline is _____ in nature.

(a) Acidic (b) Basic

(c) Neutral (d) Amphoteric

(iv) The total number of atoms per unit cell of Face centered cubic crystal (FCC) is _____.

(a) 1 (b) 2

(c) 3 (d) 4

(C) Answer the following in **ONE** sentence :– 4

(i) Define Ore.

(ii) Define Van't Hoff factor.

(iii) Define plane of symmetry.

(iv) What is reactive methylene group ?

UNIT—I

2. (A) Write the electronic configuration of 3d series elements. 4

(B) Give general characteristics of Transition elements. 4

(C) Which of the following ions are paramagnetic or diamagnetic ?

(i) Cu^{2+} (ii) Mn^{2+} (iii) Ni^{2+} (iv) Co^{2+} 4

OR

3. (P) Calculate the magnetic moment of following ions of transition series :

(i) Ti^{3+} (ii) Cr^{3+} (iii) Fe^{2+} 6

(Q) What are minerals ? 2

(R) Explain the catalytic property of 3d series elements. 4

UNIT—II

4. (A) What is Lanthanide contraction ? What are its causes ? 4

(B) Write electronic configuration of Actinides. 4

(C) Explain Froth Floatation method. 4

OR

5. (P) Explain Magnetic separation method for the concentration of ore. 4

(Q) Discuss Ion Exchange method for the separation of Lanthanides. 4

(R) Define :

(i) Calcination (ii) Roasting. 4

UNIT—III

6. (A) Discuss open chain structure of Glucose. 4

(B) Explain molecular orbital structure of Naphthalene. 4

(C) How will you convert acetoacetic ester into

(i) Acetic acid (ii) Succinic acid ? 4

OR

7. (P) How will you prepare :

(i) α-naphthyl amine from α-naphthol

(ii) α-naphthol from α-naphthalene sulphonic acid ? 4

(Q) How will you prepare following from naphthalene :

(i) 1-acetylnaphthalene

(ii) 1-chloromethyl naphthalene ? 4

(R) Write short note on Epimerization. 2

(S) How will you convert Glucose into Fructose ? 2

UNIT—IV

8. (A) Discuss the diazotization reaction with its any two synthetic applications. 4

(B) How will you prepare following from aniline :

(i) ortho and para bromoaniline (ii) phenyl isocyanide ? 4

(C) Write short notes on :

(i) Isoelectric point (ii) Strecker synthesis for amino acids. 4

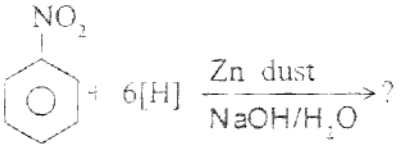
OR

9. (P) How will you prepare :

(i) Benzene from Benzene diazonium chloride

(ii) 2, 4, 6 tribromoaniline from Aniline. 4

(Q) Complete the following Reactions :

(i) 

(ii) $C_6H_5N_2Cl + H_2O \xrightarrow{H^{\oplus}\Delta} ? + ? + HCl$ 4

(R) Write short account on Gabriel Phthalimide synthesis. 4

UNIT—V

10. (A) Describe Cottrell's method for the determination of elevation of boiling point. 4

(B) Melting point of Camphor is 449.5 K. The melting point of solution containing 5.22×10^{-4} kg. Camphor and 3.86×10^{-5} kg of an unknown substance is 431.5 K. Calculate the molar mass of the unknown substance.

(K_f of camphor = 37.7 K kg mol^{-1}) 4

(C) Derive equation of Van't Hoff factor when the solute undergo Association. 4

OR

11. (P) Define :

(i) Van't Hoff factor (ii) Colligative properties. 4

(Q) Derive relation between depression of freezing point and molecular weight of solute. 4

(R) A solution containing 2.44×10^{-3} kg of solute dissolved in 75×10^{-3} kg of water boiled at 373.413 K. Calculate the molar mass of solute (K_b = 0.512 Kg mol^{-1}). 4

UNIT—VI

12. (A) Define :

(i) Unit cell (ii) Axis of symmetry. 4

(B) Describe the Bragg's spectrophotometer method for the determination of crystal structure. 4

(C) The first order reflection maxima was noted at 5.90° from 100 planes of SCC. Calculate the wavelength of X-rays if interplanar spacing was 0.282 nm. 4

OR

13. (P) Explain the structure of NaCl on the basis of X-ray diffraction. 4

(Q) Define :

(i) Space Lattice (ii) Centre of Symmetry 4

(R) Sodium has bcc lattice with density of 1×10^{-2} kg^{-3} and molar mass 23×10^{-3} kg mol^{-1}, find out length of edge of its unit cell.

(Given $N_0 = 6.023 \times 10^{23}$). 4