Exam.Code:0905
Sub. Code: 33243

2124

B.E., First Semester

ASC-X01: Applied Chemistry

(Common with CSE, ECE, MEC, EEE, IT and CIVIL)

Time allowed: 3 Hours **Max. Marks: 50**

NOTE: Attempt <u>five</u> questions in all, including Question No. I which is compulsory and selecting two questions from each Section.

x-x-x

1. (a) Draw molecular orbital diagram of O_2 molecule?

   (b) What type of molecules can absorb infrared radiations? Give two examples.

   (c) Name the monomers involved in the preparation of epoxy resins.

   (d) Give two methods to determine the configuration of geometrical isomers.

   (e) What is difference between oxo and wacker process?

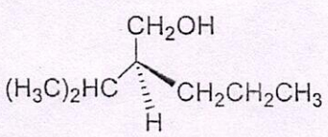
   (5x2)

SECTION-A

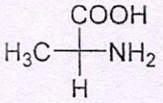
2. (a) Draw various conformations of cyclohexane and discuss their stability order in the form of potential energy diagram. **6**

   (b) Assign R/S configuration to the following by assigning priorities. **4**

   (i)



   (ii)



3. (a) Discuss the hybridization, geometry and magnetic behavior of $[Cu(NH_3)_4]$ on the basis of valence bond theory. **2**

   (b) Explain the crystal field splitting in the case of tetrahedral complexes. **4**

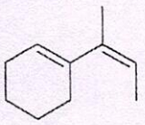
   (c) Calculate CFSE in the following cases; **4**

   (i) d^7 (octahedral, high spin) (ii) $[MnCl_4]^{2-}$

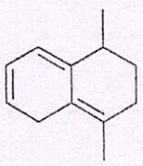
4. (a) How can primary, secondary and tertiary amines be identified using Infrared Spectroscopy? **3**

   (b) Calculate λ_{max} for the following compounds; **4**

   i)



   ii)



   (c) Discuss the effect of solvent on n-π^* transitions. **3**

P.T.O.

SECTION-B

5. (a) Derive Gibbs-Helmholtz equation at constant temperature and pressure. 5

(b) One mole of helium gas is heated from a temperature of 300 K to 600 K. Calculate the entropy change if

i) volume is kept constant

ii) pressure is kept constant

Assume that helium gas behaves like an ideal gas and Cv = 3/2 R. 5

6. (a) Explain the mechanism of carbonylation of methanol using Monsanto process. 5

(b) What is enzyme catalysis? Derive Michaelis-Menten equation to study the enzyme catalyzed reactions? 5

7. (a) Discuss the cationic mechanism for polymerization of styrene to obtain polystyrene. 5

(b) Write synthesis, properties and uses of Kevlar polymer . 5

x-x-x