Exam. Code: 0906
Sub. Code: 33293

2055
B.E., Second Semester
ASC-X01: Applied Chemistry
(Common with CSE, IT, CIV & BIO)

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

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

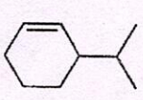
x-x-x

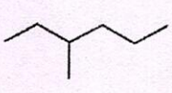
1. (a) Write characteristics of a catalyst?
   (b) State Lambert-Beer Law and prove that $A = \epsilon cx$.
   (c) What are applications of Hess's law in thermochemistry?
   (d) What is difference between internal and external compensation in stereochemistry.
   (e) Draw crystal field splitting pattern when a metal is approached by ligands in a square planar geometry?

2 x 5 = 10

SECTION-A

2. (a) Define the following terms by taking suitable example in each case;
   i) Enantiomer ii) Diastereomer iii) Racemization **6**
   (b) Identify the chiral centre and assign R/S configuration to the following molecules by assigning priorities. **4**

(i) 

(ii) 

3. (a) Explain hybridization, geometry and magnetic behavior of $[Ni(CN)_4]^{2-}$ and $[Ni(Cl)_4]^{2-}$ on the basis of valence bond theory. **4**
   (b) Explain the crystal field splitting in the case of $[CoF_6]^{3-}$ and also calculate CFSE of this complex. **6**

4. (a) Explain various types of electronic transitions that can occur in a molecule when it absorbs UV radiations? **6**
   (b) How infrared spectroscopy is useful in distinguish between following functional groups;
   i) nitro and amine ii) nitrile and alkyne **4**

P.T.O.

SECTION-B

5. (a) Describe the working of Carnot's engine and derive an expression for the efficiency of a reversible heat engine working between temperatures T_1 and T_2 ($T_2 > T_1$). **5**

   (b) 10 moles of an ideal gas at initial pressure of one atmosphere at 25°C were expanded reversibly under isothermal conditions to a final pressure of 0.1 atmosphere. Calculate the work done by the gas, the change in internal energy and heat absorbed by the system. **5**

6. (a) Draw catalytic cycle for the hydrogenation of alkene using Willkinson's catalyst and explain the meaning of each step involved in this cycle. **7**

   (b) How Michaelis constant is helpful in predicting the rate of enzyme catalyzed reaction. **3**

7. (a) Discuss the anionic polymerization of methyl methacrylate to prepare polymethyl methacrylate (PMMA). **6**

   (b) Write synthesis and uses of following polymers;

   i) Polyethylene pterephthalae (PET)

   ii) Bakelite **4**

x-x-x