Exam.Code:0905
Sub. Code: 6192

2074

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

x-x-x

1. (a) Why work done in a reversible process is always maximum?

   (b) What type of molecules can produce n-π^* transitions ?

   (c) How many isomers are possible in pentan-2,3,4-triol?

   (d) How symmetry of a polymer affects the crystallinity of a polymer?

   (e) What do you mean by CFSE in the context of crystal field theory?

2 x 5 = 10

SECTION-A

2. (a) How many conformations are possible in cyclohexane. Draw their structures. Also explain their stability order. **5**

   (b) Discuss various types of methods to resolve a racemic mixture. **5**

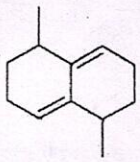
3. (a) Discuss crystal field splitting in the case of octahedral complexes. **5**

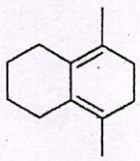
   (b) What are inner-orbital and outer-orbital complexes? Give example in each case. **5**

4. (a) Explain the following terms that are related to IR spectroscopy?

   i) Fundamental transitions ii) Hot bands iii) Fermi resonance **6**

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

   i) 

   ii) 

P.T.O.

SECTION-B

5. (a) Calculate the enthalpy of combustion of benzene, given that enthalpies of formation of C_6H_6 (l), H_2O and CO_2 (g) are 49.0, -285.8 and 393.5 kj/mol respectively. **5**

   (b) Derive expressions for w, q, ΔH and ΔE in the case of isothermal reversible expansion of an ideal gas. **5**

6. (a) Discuss the step-wise mechanism of hydrogenation of alkenes using Wilkinson's catalyst. **5**

   (b) Derive Michaelis-Menten's equation. **5**

7. (a) Calculate number average and weight average molecular weight of a given sample of polyvinyl chloride having 100 molecules of 5000 molecular mass, 150 molecules of 6000 molecular mass and 200 molecules of 10000 molecular mass. **5**

   (b) Explain the free radical mechanism for the polymerization of styrene. **5**

x-x-x