

2063  
B.E. (Computer Science and Engineering)  
Second Semester  
CH-201: Applied Chemistry

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory.

x-x-x

1. (a) State the difference between extensive and intensive properties. [10 x 1 = 10]  
(b) Define Flame Temperature  
(c) What is syndiotactic polymer, give one example of this type.  
(d) Write two major characteristics of enzyme catalyst  
(e) What is waterline corrosion.  
(f) Define auxochrome with one example  
(g) In IR spectroscopy why the region below  $1500\text{ cm}^{-1}$  is called as fingerprint region?  
(h) Give two advantages of crystal field theory  
(i) What is electrochemical Series?  
(j) What is the difference between Homogeneous and heterogeneous catalyst
2. (a) The enthalpy of combustion of methane ( $\text{CH}_4$ ) is  $-890.4\text{ kJ/mole}$ . If enthalpy of formation of  $\text{CO}_2$  and  $\text{H}_2\text{O}$  are  $-394.5$  and  $-286.6\text{ kJ/mole}$  respectively, calculate the enthalpy of formation of methane ( $\text{CH}_4$ ). [3]  
(b) Define entropy. Derive expressions of entropy change for an ideal gas with respect to pressure, volume and temperature. [5]  
(c) Define Hess's Law. What are its applications? [2]
3. (a) Give detailed mechanism for Wacker process. [5]  
(b) Derive Michaelis-Menten's equation for enzyme catalysis. When the reaction rate is of first order? [5]
4. (a) Write notes on (i) Anodic Sacrificial Protection (ii) pitting corrosion [4]  
(b) Explain rusting of iron with the help of electrochemical theory of corrosion [3]  
(c) Discuss the factors affecting corrosion [3]

P.T.O.

(2)

5. (a) Define addition and condensation polymers [2]  
 (b) Explain the mechanism of Zeigler Natta Polymerization. [3]  
 (c) Explain detailed synthesis, properties and uses of epoxy resins [5]
6. (a) Butadiene shows absorption at higher wavelength than ethylene. Explain with the help of molecular orbital diagram and  $\Psi$  function. [4]  
 (b) Calculate the number of vibrational degrees of freedom in following compounds: [3]  
 (i)  $\text{CO}_2$  (ii)  $\text{SO}_2$  (iii)  $\text{CH}_4$   
 (c) Which of the following will absorb at higher wave number for C=O stretching ; explain your answer. [3]



7. (a) Calculate the CFSE of the following compounds [4]  
 (i)  $[\text{Cr}(\text{H}_2\text{O})_6]^{3+}$ , (ii)  $[\text{Co}(\text{NH}_3)]^{3+}$ , (iii)  $[\text{Co}(\text{Cl})_4]^{2-}$ , (iv)  $[\text{Fe}(\text{Cl})_4]^-$   
 (b) How do the  $d$ -orbital energy levels split when a transition metal ion is placed in (i) an octahedral (ii) tetrahedral and (iii) square planar crystal field of the ligands ? [6]