

Exam.Code:0906  
Sub. Code: 6202

1058

B.E., Second Semester  
AS-204: Chemistry  
(May – 2016)

Time allowed: 3 Hours

Max. Marks: 50

*NOTE: Attempt five questions in all, selecting atleast two questions from each Unit. All questions carry equal marks.*

x-x-x

### UNIT – I

- I. a) How does the pressure get decreased in Isothermal Expansion?  
b) Why is the internal energy constant in case of an isothermal condition? Why is  $\Delta U$  equal to 0 for the same?  
c) Why is change in internal energy zero for isothermal process?
- II. a) Derive the Gibbs-Duhem Equation and give its Applications?  
b) Using an appropriate cyclic rule and an appropriate Maxwell relation, show that  $(\partial P / \partial V)_S = \gamma (\partial P / \partial V)_T$  where  $\gamma = C_p / c_v$ .  
c) An iron cube at a temperature of  $400^\circ \text{C}$  is dropped into an insulated bath containing 10kg water at  $25^\circ \text{C}$ . the water finally reaches a temperature of  $50^\circ \text{C}$  at steady state. Given that the specific heat of water is equal to  $4186 \text{ J / kg K}$ . find the entropy changes for the iron cube and the water. Is the process reversible? If so why?
- III. a) Differences between homogeneous and heterogeneous catalysis  
b) Write notes on Wilkinson's catalyst and hydroformylation
- IV. a) What Is Metal Corrosion and why Does It Occur?  
b) What are the different types of corrosion? Write in detail about any one type of corrosion.

### UNIT – II

- V. a) What are polymers and how are they classified .Give the mechanism of condensation polymerization.  
b) Give the uses of phenol -formaldehyde polymers.

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- VI. a) What is Born Oppenheimer Approximation? What are its applications ?  
b) What is the principle of infrared spectroscopy?  
c) What are selection rules? What are the selection rules governing the transitions in infrared spectroscopy?
- VII. a) Explain with respect to electronic spectroscopy the terms:-  
i) Chromophores  
ii) Auxochromes  
iii) Hypsochromic shift  
b) Discuss the effect of conjugation on the absorption frequencies in UV spectroscopy.
- VIII. a) Describe the following terms as used in chromatography:  
i) Elution  
ii) Dead time  
iii) Time of retention  
iv) Retention volume.  
b) Write a note on HPLC (High Performance Liquid Chromatography)

x-x-x