

**B. Tech Degree III Semester Examination, December 2006****SE 304 CHEMICAL ENGINEERING I***(1999 Admissions onwards)*

Time : 3 Hours

Maximum Marks : 100

- I. (a) State and explain second law of thermodynamics. (10)  
 (b) Derive  $\left(\frac{\delta T}{\delta P}\right)_s = -\left(\frac{\delta v}{\delta s}\right)_p$ . (10)

**OR**

- II. Write notes on :  
 (i) Joule Thomson expansion  
 (ii) Carnots refrigeration cycle  
 (iii) Entropy and enthalpy  
 (iv) Thermodynamic functions. (20)

- III. (a) Explain in detail about the effect of temperature on reaction rate. What are the factors affecting rate of a chemical reaction. (10)  
 (b) What are elementary and non elementary reactions with suitable examples? (5)  
 (c) Explain free energy change and entropy change. (5)

**OR**

- IV. Write notes on :  
 (i) Equilibrium constant and Lechatliers principle.  
 (ii) Differential and integral method of evaluation of rate constant.  
 (iii) Order and molecularity  
 (iv) Different types of chemical reactors used in industry. (4 x 5 = 20)

- V. (a) Derive the expression for differential pressure using a U – tube manometer. (10)  
 (b) Explain the different types of low pressure measuring instruments. (10)

**OR**

- VI. Explain :  
 (i) Static characteristics of an instrument  
 (ii) Mcleod vacuum gauge  
 (iii) Bimetallic thermometer  
 (iv) Measurement of level. (4 x 5 = 20)

- VII. (a) Discuss in detail about the measurement of force using strain grain gauge. (10)  
 (b) What are the different types of controllers and explain computer control? (10)

**OR**

- VIII. Write briefly on :  
 (i) Transducers (ii) Automatic control  
 (iii) Load cells (iv) Final control element.

- IX. (a) Explain the modern methods of chemical analysis. (10)  
 (b) Explain the role of polymers and ceramics in process industries. (10)

**OR**

- X. Write notes on :  
 (i) X – ray diffraction  
 (ii) Nuclear magnetic resonance  
 (iii) U V spectroscopy  
 (iv) Mass spectroscopy. (4 x 5 = 20)

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