

GUJARAT TECHNOLOGICAL UNIVERSITY**B. E. - SEMESTER – VI • EXAMINATION – WINTER 2012****Subject code: 162604****Date: 02/01/2013****Subject Name: Characterization of Rubber****Time: 02.30 pm - 05.00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1 (a)** Define the following terms: (i) Heating Rate (ii) Plateau (iii) Base line (iv) Peak (v) Peak Width (vi) Peak Height (vii) Peak Area **07**
- Q.1 (b)** Answer the following
- (i)** Give the full form of following terms: (i) ASTM (ii) ANSI (iii) DIN (iv) BSI (v) CEN **05**
- (ii)** Write down the meaning of following terms: (i) SCI WG 2 (ii) SCI WG 3 **02**
- Q.2 (a)** Discuss the applications of the various microscopic techniques in characterization of rubber and related materials. **07**
- Q.2 (b)** Answer the following
- (i)** Write a short note on Small Angle X-ray Scattering. **04**
- (ii)** Give the different circumstances in which standard test method is used. **03**
- OR**
- Q.2 (b)** Answer the following
- (i)** Write a short note on Wide Angle X-ray Scattering. **04**
- (ii)** List out the standard testing conditions. **03**
- Q.3 (a)** Discuss the scan of Dynamic Mechanical Analysis showing the types of transitions seen during the analysis by taking suitable example of rubber. **07**
- Q.3 (b)** Answer the following
- (i)** Write down the applications of Differential Thermal Analysis apparatus. **04**
- (ii)** Which different types of sample holders are used in Thermogravimetric Analyzer? **03**
- OR**
- Q.3 (a)** Explain the construction and working of thermobalance. **06**
- Q.3 (b)** Answer the following
- (i)** Give the difference between Differential Thermal Analysis and Differential Scanning Calorimetry. **04**
- (ii)** What are the requirements of good Differential Scanning Calorimetry apparatus? **04**
- Q.4 (a)** Discuss the classification of Gas Chromatography. **06**
- Q.4 (b)** Answer the following
- (i)** Write a short note on Gel Permeation Chromatography. **05**

- (ii) What do you mean by partition ratio? List the factors affecting the partition ratio. **03**
- OR**
- Q.4 (a)** Write a short note on Thin Layer Chromatography. **06**
- Q.4 (b)** Answer the following
- (i) Explain the term chromatography. Also write on partition chromatography. **05**
- (ii) What do you mean by carrier gas? Is oxygen suitable as carrier gas? Why? **03**
- Q.5 (a)** Discuss the various types of transitions that take place during ultraviolet spectrometry. **07**
- Q.5 (b)** Answer the following
- (i) Write down the procedure to determine the chloroform extract of rubber vulcanizate. **04**
- (ii) List the major components of nuclear magnetic resonance spectrometer. **03**
- OR**
- Q.5 (a)** Explain the field application of infrared spectroscopy for the pyrolyzates and films of Isoprene Rubber, Polychloroprene Rubber and Nitrile Rubber. **07**
- Q.5 (b)** Answer the following
- (i) Write down the scope of acetone extract method. Which apparatus are used to determine the acetone extract? How can we express its output? **04**
- (ii) How single beam spectrophotometer differs from double beam spectrophotometer? **03**
