

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- VIth SEMESTER–EXAMINATION – MAY- 2012****Subject code: 162604****Date: 17/05/2012****Subject Name: Characterization of Rubber****Time: 10:30 am – 01:00 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) Discuss in detail about the various test methods used to prepare the test specimens from rubber. **07**

Q. 1 (b) Answer the following

i Define the following terms: (i) Exothermic Peak (ii) Endothermic Peak **04**
(iii) Peak Height (iv) Peak Width

ii Write a brief note on Thermodialatometry. **03**

Q. 2 (a) Discuss in detail about the temperature dependent effects of modifiers and processing parameters on the mechanical properties of an Ethylene Propylene Diene Ter-Copolymer compound using Dynamic Mechanical Analysis Apparatus. **07**

Q. 2 (b) Answer the following

i Which characteristic information of rubber is obtained by Differential Scanning Calorimetry? **04**

ii Which different types of crucibles are used in Thermogravimetric Analysis? **03**

OR

Q. 2 (b) Answer the following

i Explain the Thermogravimetry and Differential Thermogravimetry curves by talking an example of Natural Rubber /Polybutadiene Rubber blend. **05**

ii Explain the term Evolved Gas Analysis. **02**

Q. 3 (a) Discuss in detail about the general classification of Chromatography. **07**

Q. 3 (b) Answer the following

i Differentiate the Gas Solid Chromatography and Gas Liquid Chromatography. **04**

ii What do you mean by Partition Ratio? List the factors affecting Partition Ratio? **03**

OR

Q. 3 (a) Discuss the important components of High Performance Liquid Chromatography Apparatus. **07**

Q. 3 (b) Answer the following

i Write a short note on Electron Capture Detector. **04**

ii Explain the working principle of Size Exclusion Chromatography. **03**

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Q. 4 (a) Explain the different types of transitions observed in complex organic **06**

molecules when they absorb the energy in Ultraviolet region.

- Q. 4 (b)** Answer the following
- i** Which different types of spectra are observed when the electromagnetic radiation interacts with the molecules? **04**
- ii** List the techniques of sample preparation of raw rubber identification by Infra-Red Spectroscopy. Which one is preferable? **04**
- OR**
- Q. 4 (a)** Explain the instrumentation of Nuclear Magnetic Resonance Spectroscopy. **06**
- Q. 4 (b)** Answer the following
- i** Explain the advantages of Fourier Transform Infrared Spectroscopy over Infra-Red Spectroscopy. **04**
- ii** What do you mean by bending vibration? Explain the different types of bending vibrations observed in molecules. **04**
- Q. 5 (a)** Answer the following
- i** What are the advantages of Scanning Electron Microscopy over Optical Microscopy? **03**
- ii** Which characteristic information is obtained by Scanning Electron Microscopy? **05**
- Q. 5 (b)** Explain the schematic of Transmission Electron Microscopy. **06**
- OR**
- Q. 5 (a)** Answer the following
- i** Which signals are generated when electron beam strike a sample? **04**
- ii** What do you mean by specimen interaction volume? On which factor it depends? **04**
- Q. 5 (b)** Explain the schematic of Transmission Electron Microscopy. **06**
