

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI • EXAMINATION – SUMMER 2013****Subject Code: 162604****Date: 29-05-2013****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 the lassalagne-sodium fusion test method to characterize the rubbers according to their elements. **07**

Q.1 (b) Answer the following

- i** Write about the confirmatory test for chloroprene rubber. **03**
- ii** With suitable examples, write a note on the national standards and give their importance in quality control of rubber and rubber products. **04**

Q.2 (a) Discuss the construction of conventional transmission electron microscope. **07**

Q.2 (b) Answer the following

- i** Give the advantages and disadvantages of scanning electron microscopy. **04**
- ii** State the Bragg's law. **03**

OR

Q.2 (b) Answer the following

- i** Explain the working of scanning electron microscope. **05**
- ii** What do you mean by specimen interaction volume? **02**

Q.3 (a) Discuss the following chromatographic parameters: **07**
(i) Resolution (ii) Retention Volume

Q.3 (b) Answer the following

- i** Explain the concept of polymer fractionation. List the techniques available for it. **04**
- ii** Write down the principle of gas chromatography. **03**

OR

Q.3 (a) Write a short note on thermal conductivity detectors. **06**

Q.3 (b) Answer the following

- i** With schematic diagram, explain the term R_f value. Also mention the factors affecting the R_f value. **04**
- ii** Write a short note on gradient elution technique. **04**

Q.4 (a) Explain the derivative thermogravimetry by taking an example of tyre compound. **06**

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Q.4 (b) Answer the following

- i** Define the following terms: (i) Complex Modulus (ii) Storage Modulus (vi) Loss Modulus (V) Phase Angle **05**
- ii** Explain the term evolved gas analysis. **03**

OR

- Q.4 (a)** Write a brief note on dynamic mechanical analysis. Describe an idealized dynamic mechanical analysis scan showing the types of transitions observed in rubber. **07**
- Q.4 (b)** Answer the following
- i** Which experimental parameters should be noted in thermogravimetry report? **04**
 - ii** Give the classification of differential scanning calorimetry apparatus with suitable diagram. **03**
- Q.5 (a)** Describe the Beer-Lambert's law. Also give its applications. **06**
- Q.5 (b)** Answer the following
- i** Describe the different transitions which are observed during ultraviolet absorption. **06**
 - ii** List the molecular deformations which are observed in vibrational spectra. **02**
- OR**
- Q.5 (a)** What do you mean by monochromator? Discuss the major components of monochromator. **07**
- Q.5 (b)** Answer the following
- i** Write down the guidelines for the interpretation of result of nuclear magnetic resonance spectroscopy. **04**
 - ii** How the preparation of thin film of raw rubber is carried out for spectroscopic analysis? **03**
