## **GUJARAT TECHNOLOGICAL UNIVERSITY**

BE - SEMESTER- VI<sup>th</sup> EXAMINATION – SUMMER 2015 Subject code: 162604 Date: 14

Date: 14/05/2015

Subject Name: Characterization of Rubber Time: 10.30am-01.00pm

Total Marks: 70

## **Instructions:**

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

Q.1	<b>(a)</b>	What do you mean by polymer fractionation? Explain the partial extraction technique to carry out polymer fractionation.	07
Q.1	(b) i ii	Answer the following Explain in brief about the groups of sources of standards. Define the given terms: (i) Acetone Extract (ii) Chloroform Extract (iii) Pyrolysis	04 03
Q.2	(a)	Discuss in detail about types of scattering take place during interaction of electron beam with atoms in rubber sample.	07
Q.2	(b) i ii	Answer the following Write down the advantages and disadvantages of Scanning Electron Microscopy (SEM). Write down the spot test for Polychloroprene Rubber. <b>OR</b>	04 03
Q.2	(b) i ii	Answer the following Write down the main difficulties in exploitation of Transmission Electron Microscopy (TEM). Write down the spot test for Natural Rubber (NR).	04 03
Q.3	(a)	Discuss the Thermogravimetric Analysis (TGA) of rubber with suitable example.	07
Q.3	(b) i ii	Answer the following Differentiate the Differential Scanning Calorimetry(DSC) and Differential Thermal Analysis. Which characteristic properties of rubber can be determined by Thermomechanical Analysis?	04 03
Q.3	(a)	<b>OR</b> Discuss the Dynamic Mechanical Analysis (DMA) of rubber with suitable example.	07
Q.3	(b) i ii	Answer the following Give the characteristics of good thermo balance design. Write a brief note on Evolved Gas Analysis (EGA).	04 03
Q.4	(a)	Describe the general classification of chromatographic method.	06

Q.4	(b) i ii	Answer the following Write a short note on electron capture detector. Explain the solvent delivery system of High Performance Liquid Chromatography (HPLC).	04 04
Q.4	(a)	<b>OR</b> Describe the classification of Gas Chromatography.	06
Q.4	(b) i ii	Answer the following Give the fundamental requisites of good Gas Chromatography detector. Also explain flame ionization detector. Write about the key characteristics of High Performance Liquid Chromatography (HPLC) column.	04 04
Q.5	(a)	Discuss in detail about the various sample preparation methods for spectroscopic analysis.	07
Q.5 0.5	(b) i ii (a)	Answer the following With necessary assumptions, derive the Beer-Lambert`s law. What do you mean by chemical shift? <b>OR</b> Discuss in detail about the different types of transitions observed during	05 02 07
Q.5	(b) i ii	<ul><li>Answer the following</li><li>Explain the essential features of single beam spectrophotometer.</li><li>Write a brief note on emission spectra.</li></ul>	04 03

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