

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI • EXAMINATION – WINTER • 2014****Subject code: 162604****Date: 05-12-2014****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) Discuss the confirmatory test for Styrene Butadiene Rubber (SBR) and Chloroprene Rubber (CR) respectively. **07**

Q.1 (b) Answer the following
i Outline the methods of test specimen preparation for characterization of rubber. **04**
ii Write down the full forms of given terms: (i) IEC (ii) DIN (iii) ANSI **03**

Q.2 (a) Discuss applications of various microscopic techniques in characterization of rubber and related materials. **07**

Q.2 (b) Answer the following
i Explain in brief about the method used to determine unutilized sulphur present in rubber vulcanizate. **05**
ii Which characteristic properties of rubber can be determined by using Small Angle X-ray Scattering? **02**

OR

Q.2 (b) Answer the following
i How an extraction analysis of vulcanizate is carried out? What is practical significance of this? **05**
ii Write down major difference between Small Angle X-ray Scattering and Wide Angle X-ray Scattering. **02**

Q.3 (a) Discuss in detail about construction and working of Thermogravimetry Analysis (TGA) apparatus. **07**

Q.3 (b) Answer the following
i Explain the stress-strain behavior of purely elastic material when it is subjected to sinusoidal oscillation. **04**
ii Draw labeled diagrams of various types of sample holders used in Thermogravimetric Analysis (TGA). **03**

OR

Q.3 (a) What do you mean by Thermogram? Explain Differential Scanning Calorimetry (DSC) thermogram of semi crystalline polymer. **07**

Q.3 (b) Answer the following
i Which methods are used to express output of Thermogravimetric Analysis (TGA)? Explain any one. **04**
ii Define the given terms: (i) Storage Modulus (ii) Loss Modulus (iii) Complex Modulus **03**

Q.4	(a)	Discuss in detail about Gel Permeation Chromatography.	07
Q.4	(b)	Answer the following	
	i	Explain the solvent delivery system used in High Pressure Liquid Chromatography.	04
	ii	Write a brief note on adsorption chromatography.	03
		OR	
Q.4	(a)	Discuss in detail about Thin Layer Chromatography (TLC).	07
Q.4	(b)	Answer the following	
	i	Why High Pressure Liquid Chromatography (HPLC) in some respects proved to be more versatile than Gas Chromatography (GC)?	04
	ii	Write a brief note on partition chromatography.	03
Q.5	(a)	Discuss various types of transition takes place during ultraviolet spectrometry.	07
Q.5	(b)	Answer the following	
	i	Give the types of molecular spectra. How they are represented?	05
	ii	What do you mean by nucleating agent?	02
		OR	
Q.5	(a)	Explain the filed application of Infra Red (IR) spectroscopy for the pyrolyzates and films of Isoprene Rubber, Polychloroprene Rubber and Nitrile Rubber.	07
Q.5	(b)	Answer the following	
	i	Write a short note on interferometer.	04
	ii	Give an importance of fractional precipitation technique.	03
