Seat No.: _____ Enrolment No._____

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 lassalgne-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: (i) Resolution (ii) Retention Volume	**07**
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 elusion 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**

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