Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI • EXAMINATION – WINTER 2013

Subject Code: 162604 **Date: 06-12-2013**

Subject Name: Characterization of Rubber

Time: 02:30 pm to 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 and chloroprene rubber respectively.	**07**
Q. 1	**(b)**	Answer the following	
	i	Write down the spot test of following rubbers with their inference: (i) Natural Rubber (ii) Silicone Rubber (iii) Polyurethane Rubber	**04**
	ii	Give full form of ASTM. Also give its importance in characterization of rubber.	**03**
Q. 2	**(a)**	Discuss applications of the various microscopic techniques in characterization of rubber and related materials.	**07**
Q. 2	**(b)**	Answer the following	
	i	Write down the procedure to determine the acetone extract.	**04**
	ii	Explain the following terms:(i) Bound Sulphur (ii) Free Sulphur	**03**
		OR	
Q. 2	**(b)**	Answer the following	
	i	Explain the term pyrolyzate.	**02**
	ii	Write a short note on evolved gas analysis.	**05**
Q. 3	**(a)**	Discuss in detail about the thermogravimetric analysis of rubber with suitable example.	**07**
Q. 3	**(b)**	Answer the following	
	i	Write down the applications of differential thermal analyzer.	**04**
	ii	Define the given terms: (i) Heating Rate (ii) Plateau (iii) Baseline	**03**
		OR	
Q. 3	**(a)**	Discuss the construction and working of differential scanning calorimetry apparatus.	**07**
Q. 3	**(b)**	Answer the following	
	i	Compare differential scanning calorimetry with differential thermal analysis.	**04**
	ii	Define the given terms: (i) Peak Width (ii) Peak Height (iii) Peak Area	**03**
Q. 4	**(a)**	Discuss in detail about the classification of gas chromatography.	**07**
Q. 4	**(b)**	Answer the following	
	i	What do you mean by partition ratio? List the factors affecting the partition ratio.	**04**
	ii	Write a brief note on back scattered electrons.	**03**

OR

Q. 4	**(a)**	Discuss in detail about the gel permeation chromatography.	**07**
Q. 4	**(b)**	Answer the following	
	i	Write a short note on electron capture detector.	**04**
	ii	Explain in brief about bragg's law.	**03**
Q. 5	**(a)**	Discuss the various types of transitions take place during ultraviolet spectroscopy.	**07**
Q. 5	**(b)**	Answer the following	
	i	Explain the working of single beam spectrophotometer.	**05**
	ii	What do you mean by specimen interaction volume? List the factors affecting it.	**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	Give the types of molecular spectra. How they are represented?	**05**
	ii	What do you mean by microscopy? Give its classification.	**02**

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