Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

B. E. - SEMESTER – III • EXAMINATION – WINTER 2012

Subject code: 132601 **Date: 07-01-2013**

Subject Name: Basic Rubber Science

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 in detail about the chain structure and chemical reactivity of rubber.	**07**
Q. 1	**(b)**	Answer the following	
	i	Write down the general rules for polymer solubility.	**04**
	ii	Explain the term poisson's ratio. Also give the poisson's ratio value for rubber.	**03**
Q. 2	**(a)**	Discuss in detail about the applications of colloids.	**07**
Q. 2	**(b)**	Answer the following	
	i	State Archimedes principle and distinguish between the terms specific gravity and density. Describe a method for determination of relative density of piece of soft pure gum vulcanized rubber, indicate clearly the precautions you would take to minimize the error.	**05**
	ii	For rubber, summarize first law of Amonton's friction.	**02**
		OR	
Q. 2	**(b)**	Answer the following	
	i	Differentiate the rubbery deformation and elastic deformation.	**04**
	ii	Write about the sliding friction of rubber.	**03**
Q. 3	**(a)**	Describe, with the aid of diagram, what you understand by term electromagnetic wave. Name and define the quantities which are used to characterize an electromagnetic wave. What are the principle regions into which the electromagnetic spectrum is divided? Which of these regions have found application in rubber science and technology and for what purposes?	**06**
Q. 3	**(b)**	Answer the following	
	i	Write a short note on electrical properties of rubber.	**05**
	ii	Explain the term surface tension. What will be the height of liquid in a capillary tube of diameter $5*10^{-4}$ meter? Surface tension of water is $7*10^{-2}$ N/meter and angle of contact is 0°.	**03**
		OR	
Q. 3	**(a)**	Discuss the features of sinusoidal vibrations.	**06**
Q. 3	**(b)**	Answer the following	
	i	Define the following terms: (i) Conduction (ii) Convection (iii) Radiation (iv) Thermal Conductivity (v) Thermal Diffusivity	**05**

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	ii	A capillary tube of diameter 0.5 mm is dipped vertically in a liquid density of	**03**

0.89 gram/cc. Determine the height of liquid in capillary. Surface tension of liquid is 28 dyne/cm and angle of contact is 16°28'.

Q. 4	**(a)**	Discuss in detail about the emulsion polymerization technique.	**07**
Q. 4	**(b)**	Answer the following	
	i	Differentiate the addition polymerization and condensation polymerization.	**04**
	ii	Explain the term degree of polymerization with suitable example.	**03**
		OR	
Q. 4	**(a)**	Discuss the solution polymerization technique with its advantages and disadvantages.	**07**
Q. 4	**(b)**	Answer the following	
	i	Write a short note on initiators.	**05**
	ii	Give the classification of polymer based on the origin.	**02**
Q. 5	**(a)**	List the various purification methods for colloidal solution. Describe any two.	**06**
Q. 5	**(b)**	Answer the following	
	i	Write in detail about the characteristics of colloidal state.	**04**
	ii	What do you mean by lyophilic sols? List the characteristics of it with examples.	**04**
		OR	
Q. 5	**(a)**	Write a short note on emulsion.	**06**
Q. 5	**(b)**	Answer the following	
	i	What do you mean by tydnall effect? What are the causes of it?	**04**
	ii	Write in detail about the gel.	**04**

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