Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

B.E. Sem-Vth Examination December 2010

Subject code: 152601 **Subject Name: Vulcanization**

Date: 13 /12 /2010 **Time: 03.00 pm - 05.30 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)**	(i) Define the following terms: (1)Rate of Cure (2) State of Cure (3) Peak Cure (4) Coefficient of Vulcanization	**04**
		(ii) List the various allotropic forms of sulphur. Write about any two.	**04**
	(b)	Write a short note on Moving Die Rheometer (MDR)	**06**
Q.2	**(a)**	How is vulcanization of thick rubber article carried out?	**06**
	(b)	Answer the following	
	(i)	(i) How is a selection of accelerator carried out? Which adjustments are necessarily made after the basic cure system has been selected?	**04**
		(ii) Write a short note on Dithiocarbamate accelerator.	**04**
		OR	
	(b)	Discuss in detail about accelerated sulphur vulcanization.	**08**
Q.3	**(a)**	(i) How is state of cure determined by chemical method?	**05**
		(ii) Explain the effect of crosslink density and crosslink types on strength and modulus respectively.	**05**
	(b)	Answer the following	
		(i) What do you mean by co-agents? Give the examples of co-agents.	**02**
		(ii) Give the classification of peroxides with their structures.	**02**
		OR	
Q.3	**(a)**	(i) How is state of cure determined by showbury curometer?	**04**
		(ii) Explain Conventional, Efficient and Semi-Efficient vulcanization system with suitable examples.	**06**
	(b)	(i) Vulcanization of Silicone Rubber is usually done in two steps-why?	**02**
		(ii) Is peroxide preferable as vulcanizing agent for dienes? Why?	**02**
Q.4	**(a)**	(i) Write in detail about applications of Microwave Vulcanization technique.	**04**
		(ii) Discuss the limitations of Hot Air Vulcanization.	**06**
	(b)	Explain the working principle of Fluidized Bed Vulcanization.	**04**
		OR	
Q.4	**(a)**	**(i)** What do you mean by Cold Vulcanization? Explain it in detail.	**06**
		(ii) Write about the Electron Beam Vulcanization equipment.	**06**
	(b)	List the products which can be cured by Rotocure.	**02**
Q.5	**(a)**	Compare chemical vulcanization with irradiation vulcanization.	**04**
	(b)	(i) How is determination of temperature dependence carried out by Arrhenius equation?	**04**
		(ii) Write about the limits of vulcanization temperature.	**06**
		OR	
Q.5	**(a)**	Discuss in detail about the vulcanization of non-olefine rubber by polyfunctional amines.	**08**
	(b)	Write a short note on structure of rubber vulcanizate.	**06**

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