Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V • EXAMINATION – SUMMER 2013

Subject Code: 152601 **Date: 14-05-2013**

Subject Name: Vulcanization

Time: 10:30 pm to 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)**	Answer the following	
	i	How the vulcanized rubber differs from unvulcanized rubber?	**04**
	ii	Give the classification of accelerated sulphur vulcanization system. Which one is preferable? Why?	**03**
Q.1	**(b)**	List the possible reaction mechanisms for sulphur vulcanization. Discuss any one in detail.	**07**
Q.2	**(a)**	With neat sketch, discuss the rheograph and related features.	**07**
Q.2	**(b)**	Answer the following	
	i	Write a short note on structure of rubber vulcanizate.	**05**
	ii	Explain the term ebonite.	**02**
		OR	
Q.2	**(b)**	Answer the following	
	i	Write about the construction and working of moving die rheometer.	**04**
	ii	How the cure temperature is determined for thick circular rubber slab?	**03**
Q.3	**(a)**	Write a short note on thiozole accelerators.	**07**
Q.3	**(b)**	Answer the following	
	i	Explain the effect of crosslink types and crosslink density on modulus and strength of rubber vulcanizate.	**05**
	ii	What do you mean by dynamic vulcanization?	**02**
		OR	
Q.3	**(a)**	Write a short note on dithiocarbamate accelerators.	**07**
Q.3	**(b)**	Answer the following	
	i	Explain the effect of crosslink types and crosslink density on ageing and fatigue properties of rubber vulcanizate.	**04**
	ii	How an assessment of state of cure is done by physical method?	**03**
Q.4	**(a)**	Discuss in detail about the advantages and disadvantages of peroxide cure.	**07**
Q.4	**(b)**	Answer the following	
	i	What are the prime requirements for the rubber compound to be cured by microwave vulcanization technique?	**04**

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	ii	Explain the principle of ultrasonic vulcanization.	**03**

OR

Q.4	**(a)**	Discuss the peroxide vulcanization of saturated rubber and unsaturated rubber respectively with suitable examples.	**07**
Q.4	**(b)**	Write a short note on electron beam vulcanization.	**07**
Q.5	**(a)**	Discuss in detail about the liquid curing method.	**08**
Q.5	**(b)**	Answer the following	
	i	How the vulcanization is carried out in autoclave?	**04**
	ii	Write a brief note on high velocity gas curing.	**02**

OR

Q.5	**(a)**	Discuss the limitations of vulcanization temperature.	**07**
Q.5	**(b)**	Answer the following	
	i	Write a short note on rotocure.	**04**
	ii	Give the limitations of fluidized bed vulcanization.	**03**

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