Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V • EXAMINATION – WINTER • 2014

Subject Code: 152601 Date: 26-11-2014

Subject Name: Vulcanization

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 differences between vulcanization properties of Natural Rubber and Synthetic Rubber.	**07**
Q.1	**(b)**	Answer the following	
	i	Define the given terms: (i) Induction Time (ii) Scorch Time (iii) Reversion Time (iv) Cure Rate	**04**
	ii	Explain the term 'Ebonite'.	**03**
Q.2	**(a)**	With labeled diagram, explain construction and working of Oscillating Disc Rheometer (ODR).	**07**
Q.2	**(b)**	Answer the following	
	i	How an assessment of state of cure is done by chemical method?	**05**
	ii	Which different types of crosslinks take place during sulphur vulcanization?	**02**
		OR	
Q.2	**(b)**	Answer the following	
	i	How an assessment of state of cure is done by physical method?	**04**
	ii	Give any two examples of sulphur donors with their structures.	**03**
Q.3	**(a)**	Discuss in detail about thiourea accelerators.	**07**
Q.3	**(b)**	Answer the following	
	i	With suitable examples, explain the classification of peroxides as a vulcanizing agent.	**04**
	ii	Write in brief about dynamic vulcanization.	**03**
		OR	
Q.3	**(a)**	Discuss in detail about guanidine accelerators.	**07**
Q.3	**(b)**	Answer the following	
	i	Write down advantages and disadvantages of peroxide vulcanization.	**05**
	ii	List out the properties of unvulcanized rubber compound.	**02**
Q.4	**(a)**	Discuss in detail about molten salt bath method.	**07**
Q.4	**(b)**	Answer the following	
	i	Write a short note on shawbury curometer.	**05**
	ii	List the properties which are strongly affected due to increment in crosslink density.	**02**
		OR	
Q.4	**(a)**	Explain the construction and working of microwave vulcanization equipment. Which products can be cured by microwave vulcanization technique?	**07**

Q.4	**(b)**	Answer the following	
	i	Explain an effect of crosslink structure on the dynamic properties of vulcanizate.	**05**
	ii	List out the properties which are less strongly affected due to increment in crosslink density.	**02**
Q.5	**(a)**	Describe hot air vulcanization.	**06**
Q.5	**(b)**	Answer the following	
	i	How vulcanization is carried out by sulphur dichloride?	**04**
	ii	Compare chemical vulcanization with irradiation processing.	**04**

OR

Q.5	**(a)**	Describe vulcanization in water.	**06**
Q.5	**(b)**	Answer the following	
	i	Explain the principle of ultrasonic vulcanization.	**04**
	ii	Give comparison between various continuous vulcanization techniques.	**04**

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