

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- Vth SEMESTER-EXAMINATION – MAY/JUNE - 2012****Subject code: 152601****Date: 01/06/2012****Subject Name: Vulcanization****Time: 02:30 pm – 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)** Answer the following
- i. What are the drawbacks of raw rubber? How they are removed? **04**
 - ii. What is an effect of thickness on vulcanization process? **03**
- Q.1 (b)** Discuss the structure of rubber vulcanizate. **07**
- Q.2 (a)** Explain the rheograph with its characteristic features. **07**
- Q.2 (b)** Write a short note on various allotropic forms of sulphur. **07**
- OR**
- Q.2 (b)** What is a basic principle to calculate the degree of shrinkage? How is it calculated? **07**
- Q.3 (a)** Answer the following
- i. Give the generally accepted reaction scheme for accelerated sulphur vulcanization. **05**
 - ii. Define the following terms: (i) Rate of Cure (ii) State of Cure (iii) Crosslink density (iv) Post Cure (v) Peak Cure **05**
- Q.3 (b)** Explain the vulcanization of elastomers by metal oxide with suitable examples. **04**
- OR**
- Q.3 (a)** Answer the following
- i. Explain the role of amine type accelerators in vulcanization. **05**
 - ii. Write about the Bismaleimides as a vulcanizing agent. **05**
- Q.3 (b)** What are the different ways to modify the basic cure system? **04**
- Q.4 (a)** Write a short note on Dynamic Vulcanization **06**
- Q.4 (b)** Discuss in detail about the peroxide vulcanization with its merits and demerits. **08**
- OR**
- Q.4 (a)** Discuss the effect of crosslink density on the following properties of rubber vulcanizate: (i) Modulus and Strength (ii) Compression Set **07**
- Q.4 (b)** Answer the following
- i. Explain the Mooney-Rivlin equilibrium method to determine the state of cure. **04**
 - ii. What are the advantages of Moving Die Rheometer over Oscillating Disc Rheometer? **03**

- Q.5 (a)** Explain the prime compounding requirements of the material to be cured by microwave. Also write about the major components of the microwave apparatus. **07**
- Q.5 (b)** Answer the following
- i.** Write about the rotocure **04**
 - ii.** Give the classification of sulphur vulcanization system. **03**
- OR**
- Q.5 (a)** Write a short note on Electron Beam Vulcanization. **07**
- Q.5 (b)** Answer the following
- i.** How is vulcanization carried out in autoclave? **04**
 - ii.** Write about the solubility of sulphur in rubber. **03**
