

GUJARAT TECHNOLOGICAL UNIVERSITY**BE – SEMESTER V • EXAMINATION – WINTER - 2012****Subject code: 152601****Date: 11-01-2013****Subject Name: Vulcanization****Time: 02:30 pm to 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.
4. Write the answer to the points.

- Q. 1 (a)** What do you mean by state of cure? Explain the chemical method and physical method to determine the state of cure respectively. **07**
- Q. 1 (b)** Answer the following
- i** What are the advantages of Moving Die Rheometer over Oscillating Disc Rheometer? **04**
- ii** Explain the basic principle to calculate the degree of shrinkage for rubber vulcanizate. **03**
- Q. 2 (a)** Discuss in detail about the limitations of vulcanization temperature. **07**
- Q. 2 (b)** Answer the following
- i** Write a short note on colloidal sulphur. **05**
- ii** List the various allotropic forms of sulphur. **02**
- OR**
- Q. 2 (b)** Answer the following
- i** Explain the different vulcanization phases observed during the free heating. **05**
- ii** List the properties which are optimized in Natural Rubber vulcanizates with short crosslinks. **02**
- Q. 3 (a)** Discuss in detail about the accelerated sulphur vulcanization with its chemistry. **07**
- Q. 3 (b)** Answer the following
- i** How the uniform state of cure can be achieved in thick rubber article? **04**
- ii** Explain the conventional vulcanization system with suitable example. **03**
- OR**
- Q. 3 (a)** Describe the guidelines for accelerated sulphur vulcanization formulations. **07**
- Q. 3 (b)** Answer the following
- i** Explain the characteristic properties of unvulcanized rubber compound. **05**
- ii** Explain the term vulcanite. **02**
- Q. 4 (a)** Write a short note on thiozole accelerators. **07**
- Q. 4 (b)** Answer the following
- i** Why sulphur vulcanization is preferred for diene rubbers instead of peroxides? **04**
- ii** Which different radiation sources are used in high energy radiation? **03**
- OR**
- Q. 4 (a)** Discuss in detail about the zinc dithiocarbamate accelerator. **07**

- Q. 4 (b)** Answer the following
- i** Explain the vulcanization of rubber by metal oxides with suitable examples. **04**
 - ii** Which different types of polarization are observed in ultra high frequency vulcanization? **03**
- Q. 5 (a)** Discuss in detail about the fluidized bed vulcanization. **07**
- Q. 5 (b)** Answer the following
- i** Draw schematic diagram of rotocure vulcanization technique. Also mention the standard working temperature, pressure and time at which vulcanization is carried out. **04**
 - ii** Which are the disadvantages of saturated steam vulcanization method? **03**
- OR**
- Q. 5 (a)** Explain the influence of compound composition on liquid curing method. **06**
- Q. 5 (b)** Answer the following
- i** Write down the merits and demerits of batch vulcanization techniques and continuous vulcanization techniques respectively. **04**
 - ii** Explain the construction of ultrasonic vulcanization equipment. **04**
