

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-IV • EXAMINATION – SUMMER • 2014

Subject Code: 142604

Date: 25-06-2014

Subject Name: Introduction to Rubbers and Rubbery Materials

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** Answer the following. **14**
- i** Write about the atmospherical conditions required for the growth of Hevea Brasiliensis tree.
 - ii** What do you mean by Hysteresis energy Loss?
 - iii** Write any two structural requirements to exhibit effective rubbery properties.
 - iv** Draw the structure of Neoprene rubber and write its advantageous properties.
 - v** Define the term “Polymerization”.
 - vi** How dry natural rubber is manufactured from NR Latex?
 - vii** Describe the term “mastication” and write its importance.
- Q. 2 a** Show the schematic representation of rubber blocks in shear stress and derive the equation for shear stiffness. **07**
- Q. 2 b** Define the term “Glass Transition Temperature”. List the factors determining Tg and explain it in detail. **07**
- OR
- b** Write about the Heat Resistance property of Rubber and the factors affecting it in detail. **07**
- Q. 3 a** List the different type of mixing equipment and explain about any one. **07**
- b** Discuss about Sulfur vulcanization with schematic representation. **07**
- OR
- Q. 3 a** Write the basic types of compounding ingredients used in rubber industry with their functions and give example of each. **07**
- b** Short note on Non-sulfur vulcanization systems. **07**
- Q. 4 a** Define the term “Polymer”. Give a detailed classification of Polymers. **07**
- b** Define the term “Latex”. Write about the processing of Natural Rubber Latex after Tapping. **07**
- OR
- Q. 4 a** What do you mean by Polymer Crystallinity? Discuss about X-Ray Diffraction for polymers with schematic diagram. **07**
- b** Answer the following.
- i** Explain the production of Pale crepe grade of Natural Rubber and write its applications. **05**
 - ii** List any four modified forms of Natural Rubber. **02**
- Q. 5 a** Give the synthesis reaction of Butyl Rubber. Explain its chemistry, properties and applications. **07**
- b** Write about abbreviation, repeat unit structure, grades, properties and applications for Silicon Rubber. **07**
- OR
- Q. 5 a** List the name and structure of monomers used in synthesis of Ethylene Propylene Diene Methylene Rubber EPDM. Discuss its chemistry, properties and Applications. **07**
- b** Give the synthesis reaction of Nitrile Rubber. Explain the importance of monomer ratio on properties of Nitrile Rubber. **07**
