

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-IV • EXAMINATION – SUMMER • 2014

Subject Code: 142602

Date: 20-06-2014

Subject Name: Natural Rubber Science and Technology

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 the process for manufacturing of SMR CV grade of Natural Rubber.
- (ii) List the types of chemical modifications in Natural Rubber.
- (iii) Which are the basic requirements of Graft co-polymer?
- (iv) Give expression for first law of diffusion theory.
- (v) Draw the schematic diagram for ground scrap rubber preparation.
- (vi) What do you mean by Liquid Rubber? Draw its network structure.
- (vii) Write the thermodynamic expression for low temperature crystallization process.

Q. 2 (a) Discuss the advantages of powdered and particulate rubber. **(07)**

Q. 2 (b) Explain the influence of various Non-Rubber Substances on properties of Natural Rubber. **(07)**

OR

(b) Short note on Processing of Natural Rubber Latex. **(07)**

Q. 3 (a) Discuss about compounding, vulcanization, properties and applications of Epoxidized Natural Rubber. **(07)**

(b) Derive the formula for shear stiffness (Ks) for bonded rubber components under shear deformation. **(07)**

OR

Q. 3 (a) Answer the following.

(i) Give the reactions for simple substitution at olefinic double bond of Natural Rubber. **(03)**

(ii) Write the basic reaction mechanism for epoxidation of Natural Rubber. **(04)**

(b) List the environmental factors involved in life and performance of Natural rubber product and explain it. **(07)**

Q. 4 (a) List the parameters which affect the rate of Diffusion process. Explain any two. **(07)**

(b) Explain about the preparation of Polystyrene prepolymer for grafting process by giving reaction mechanism. **(07)**

OR

Q. 4 (a) "Blooming is a diffusion controlled process." Justify the statement. **(07)**

(b) Discuss the effect of following parameters on properties of Graft co-polymers (i) Grafting efficiency (ii) Polystyrene Molecular weight (iii) Polystyrene content **(07)**

Q. 5 (a) List the stages of low temperature crystallization process in Natural Rubber and explain it in detail. **(07)**

(b) Draw the diagram for Reclaimator process and explain it. **(07)**

OR

Q. 5 (a) Write about the measurement of Elastic modulus by compression stress during low temperature crystallization in Natural Rubber. **(07)**

(b) Short note on Rubberized Asphalt. **(07)**
