

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER- IV (New) EXAMINATION – WINTER 2019

Subject Code: 2142602

Date: 14/12/2019

Subject Name: Natural Rubber Science & Technology

Time: 10:30 AM TO 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) What is the difference between network structure of conventional and liquid elastomers? **03**
- (b) Describe the suitable method to achieve carbon black dispersion in liquid polybutadiene rubber. **04**
- (c) Explain in detail about RSS and Pale Crepe grades of natural rubber. **07**
- Q.2** (a) Write about the effect of compounding ingredients on diffusion process. **03**
- (b) Describe the 'storage hardening' as an important phenomenon related with natural rubber. **04**
- (c) Discuss in detail about the general features of wax blooming. **07**
- OR**
- (c) Explain the effect of 'nature of liquid' and 'nature of rubber' in the diffusion of hydrocarbon liquids and oils. **07**
- Q.3** (a) List the types of chemical modification on natural rubber. **03**
- (b) Why natural rubber is considered to be very reactive polymer? Describe with suitable explanation. **04**
- (c) Write a short note on Grafting chemistry. **07**
- OR**
- Q.3** (a) Define the purpose of chemical modification of natural rubber. **03**
- (b) Write about [3 + 2] cycloaddition reaction mechanism with suitable example. **04**
- (c) Explain the tensile stress-strain behaviour of graft copolymer. **07**
- Q.4** (a) Write about Hysteresis. **03**
- (b) How can you measure puncture strength? Describe with schematic view of the test. **04**
- (c) Discuss in detail about the experimental method for the measurement of elastic modulus throughout the crystallization process. **07**
- OR**
- Q.4** (a) Which kind of changes arise to rubber products due to the effect of environmental factors? **03**
- (b) Describe the creep and stress relaxation properties for vulcanized rubber. **04**
- (c) Explain in detail about the tensile modulus variation with crystallization time and crystallization temperature respectively. **07**
- Q.5** (a) What do you mean by SAM and SAMI related with asphalt rubber in paving application? **03**
- (b) Write about the different types of reclaimed rubber. **04**
- (c) List the methods used for preparation of powdered rubber. Explain in detail about any two. **07**
- OR**
- Q.5** (a) List the uses of reclaimed rubber. **03**
- (b) Write about Heater process for the production of reclaimed rubber. **04**
- (c) Discuss about the advantages of powdered rubbers. **07**
