

Enrollment No./Seat No.:

GUJARAT TECHNOLOGICAL UNIVERSITY
Bachelor of Engineering - SEMESTER - V EXAMINATION - SUMMER 2025

Subject Code: 3152612

Date: 13-05-2025

Subject Name: Reclaimed Rubber & its Technology

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.**

	Marks
Q.1 (a) Write the cure characteristic of SBR/WTR blends?	03
(b) Describe the effect of Silane coupling agent on CR/WTR blends.	04
(c) Develop new curing systems compatible with reclaimed rubber.	07
Q.2 (a) Analyze the effect of Maleic Anhydride grafting on reclaim rubber.	03
(b) Explain the advantages & disadvantages of Reclaim rubber.	04
(c) Assess the environmental and economic benefits of using microbiological devulcanization.	07
OR	
(c) Assess the environmental impact and commercial viability of microwave devulcanization for tire recycling.	07
Q.3 (a) Define the types of reclaim rubber grades use in rubber Industry.	03
(b) Explain the Reactivity of covalent bonds in properties of sulfur cross links.	04
(c) Assess the re usability of a devulcanized rubber sample based on its mechanical test results	07
OR	
(a) What is Butyl reclaim & how it's made.	03
(b) Explain the stiffness of covalent bonds in properties of sulfur cross links.	04
(c) Describe in detail about the test that can be carried out to obtain physical properties of vulcanisates containing de-vulcanised rubber.	07
Q.4 (a) Compare the mechanical behavior of pure NBR with that of NBR/WTR blends	03
(b) Sketch a flow diagram of the digester-based devulcanization setup.	04
(c) Develop a new CR/MA-g-WTR compound for enhanced tear resistance and reduced cure time.	07
OR	
(a) Analyze the role of chemical additives in the digester devulcanization process.	03

- (b) Measure and interpret the torque difference in a CR/MA-g-WTR blend using rheometer data. 04
 - (c) Design a formulation of NBR/WTR with improved tensile strength using a compatibilizer. 07
- Q.5**
- (a) List down devulcanising agents used for Mechanical devulcanisation in the presence of chemical agents process. 03
 - (b) Define Silane coupling agent & why it is use in Reclaim rubber 04
 - (c) Describe in detail about Thermal Devulcanisation process. 07

OR

- (a) List down the dis-advantage of ultrasonic devulcanisation process. 03
- (b) Among all WTR blends which shows superior result by using coupling agent & why? 04
- (c) Describe in detail about Mechanical Devulcanisation process. 07
