

Enrollment No./Seat No.:

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

Subject Code: 3152612

Date: 17-11-2025

Subject Name: Reclaimed Rubber & its 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.**
- 4. Simple and non-programmable scientific calculators are allowed.**

	Marks
Q.1 (a) List down all the devulcanisation techniques with the basis of process.	03
(b) Give the advantages and dis-advantages of Micro-biological devulcanisation.	04
(c) Explain in detail about structure of sulfur vulcanised rubber and the properties of sulfur crosslinks.	07
Q.2 (a) Give brief about Watson Brown HSM process.	03
(b) Discuss about super-critical CO ₂ & its use in devulcanisation technique.	04
(c) Illustrate in detail about Ultrasonic de-vulcanisation technique.	07
OR	
(c) Explain in detail about Microwave de-vulcanisation technique.	07
Q.3 (a) Outline the importance of characterization for devulcanised rubber.	03
(b) Describe brief about DSC (Differential Scanning Calorimetry) and its used Reclaim rubber industry	04
(c) Analyze mechanical properties of NBR/ WTR blends.	07
OR	
(a) Explain the technique used to determine Mw (Molecular weight) of de-vulcanised rubber.	03
(b) Give brief about NMR (Nuclear Magnetic Resonance) spectroscopy and its used Reclaim rubber industry	04
(c) Interpret cure characteristics of PBR/WTR blends.	07
Q.4 (a) Summarize the importance of blending of WTR with other rubbers.	03
(b) Describe Neutral and Alkali Digester process.	04
(c) Analyze mechanical properties of CR/ MA-g-WTR blends.	07
OR	
(a) Among all the blends of rubber with WTR which blend shows inferior properties and why?	03

- (b) Explain Reclaimator process. 04
- (c) Compare and analyze cure characteristics of NBR/ MA-g-WTR blends. 07
- Q.5** (a) Give Importance of grafting or coupling agents on reclaim rubber 03
- (b) Differentiate all three blends (NBR/WTR, CR/WTR, and SBR/WTR) with silane coupling agent and which blend shows better tear resistance explain with detail. 04
- (c) Evaluate the cure characteristic of silane coupling agent on SBR/WTR blends. 07

OR

- (a) Explain the importance of coupling agent on to reclaim rubber. 03
- (b) Analyze the relationship between filler–rubber interaction (using bound rubber or swelling data) and blend mechanical performance. 04
- (c) Evaluate the chemical interaction mechanism between silane and WTR surface and analyze its effect on crosslink density. 07
