

Enrollment No./Seat No.:

GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering - SEMESTER - VI EXAMINATION - SUMMER 2025

Subject Code: 3162603

Date: 20-05-2025

Subject Name: Rubber Equipment Design

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.

	Marks
Q.1 (a) State two differences between Banbury and Intermix mixers.	03
(b) Illustrate the role of pressure control in Banbury mixing processes.	04
(c) Create a flowchart showing different stages in a typical rubber mixing cycle using internal mixers and explain different mixing methods.	07
Q.2 (a) Define the terms: (i) Sheetting (ii) Skimming (iii) Spreading	03
(b) Analyze the impact of roll alignment on calendaring precision.	04
(c) Evaluate the main challenges in achieving thickness uniformity during calendaring and suggest methods to overcome them.	07
OR	
(c) Analyze how the type of calendar configuration impacts process control, product consistency, and maintenance requirements.	07
Q.3 (a) List out the different mechanism of ram driving.	03
(b) A hydraulic press has a small piston with a diameter of 4 cm and a large piston with a diameter of 30 cm. If a force of 100 N is applied to the small piston, determine the force exerted by the large piston.	04
(c) Compare and contrast all five types of runner cross sections in terms of efficiency, ease of manufacture, and application.	07
OR	
(a) Analyze the relationship between press force, cylinder diameter, and system pressure.	03
(b) Differentiate between single-acting and double-acting hydraulic presses.	04
(c) Explain how to achieve balanced material flow using both naturally and artificially balanced runner systems, including a comparison of their pros and cons.	07
Q.4 (a) List three basic requirements for die design.	03
(b) Identify the major differences between single screw and multi screw extruders in terms of mixing and output.	04
(c) Compare and contrast the operational principles, advantages, and disadvantages of single screw, twin screw, and ram extruders.	07

OR

- (a)** Explain how screw geometry affects material flow in a single screw extruder. **03**
 - (b)** Discuss the effects of barrel and screw temperatures on extrusion output. **04**
 - (c)** Explain in detail the role and interaction of extruder hardware components such as the liner, extension barrel, and feed roller in maintaining consistent output. **07**
- Q.5**
- (a)** List the steps involved in the molding cycle of transfer molding. **03**
 - (b)** Explain the influence of mold release agents in compression molding. **04**
 - (c)** Design a selection criterion for choosing a suitable injection molding machine for a thermoplastic automotive component. **07**

OR

- (a)** Analyze the role of crosslinking during the transfer molding process. **03**
- (b)** Discuss the causes and effects of anisotropy in transfer molded parts. **04**
- (c)** Explain in detail the parts and functions of a conventional injection mold including bolster, guide pillars, and plates. **07**
