Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–IV EXAMINATION – WINTER 2025

Subject Code:3142603 Date:18-11-2025

Subject Name:Rubber Engineering & its Economics

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.**
4. **Simple and non-programmable scientific calculators are allowed.**

			Marks
Q.1	**(a)**	Define the given terms: (i) Supply (ii) Growth Development (iii) Inflation.	**03**
	(b)	Outline the various functions of Rubber Engineer in the Rubber Industry.	**04**
	(c)	What is the role of the Maintenance Department? Explain in detail.	**07**
Q.2	**(a)**	State the primary purpose of the emergency brake mechanism on an Open Mixing Mill.	**03**
	(b)	Briefly explain the phenomenon of "Band Formation" in rubber milling.	**04**
	(c)	Discuss the significance of the various stages associated with the rubber mixing process on an open mill, from band formation to final sheet-off. What factors determine the end of the mixing cycle?	**07**
		OR	
	(c)	Discuss how the rotor design (e.g., tangential vs. intermeshing) influences the efficiency and quality of the rubber compound.	**07**
Q.3	**(a)**	List any three ancillary equipment (e.g., cooling troughs, take-off units) used with a rubber extruder.	**03**
	(b)	Distinguish between a Hot Feed Extruder and a Cold Feed Extruder based on raw material input and pre-heating requirements.	**04**
	(c)	Outline the detailed procedure for preparing and setting up the compression mould (e.g., cleaning, applying release agent, loading the pre-form)	**07**
		OR	
Q.3	**(a)**	Define the following terms with respect to extrusion: L/D Ratio and Compression Ratio.	**03**
	(b)	Draw a simple, neat cross-sectional sketch of a single-screw extruder and label the main components responsible for material conveyance and pressure generation.	**04**
	(c)	Distinguish between the Compression Moulding and Transfer Moulding techniques when utilizing Hand Press.	**07**
Q.4	**(a)**	Define the term "Nip Guard" in the context of an open mixing mill. What is its primary function?	**03**
	(b)	Explain the working principle of the rupture disc (or pressure relief valve) installed on an extruder barrel or head.	**04**
	(c)	Explain the role of the E-Stop (Emergency Stop) buttons and their placement on the press.	**07**
		OR	
Q.4	**(a)**	List of three different types of safety tripping devices commonly used on a two-roll mixing mill.	**03**
	(b)	Distinguish between a guard and an interlock as safety features on an extruder, providing an example of each.	**04**

	(c)	Analyze the potential hazards related to mold misalignment and excessive pressure buildup during the initial trials and then propose three specific safety devices/procedures that an engineer must implement to mitigate these risks.	**07**
Q.5	**(a)**	Define the following terms with respect to compression moulding: (i) Flash, (ii) Cavity, (iii) Cure Time.	**03**
	(b)	List and briefly explain any four key advantages of the Compression Moulding process.	**04**
	(c)	Analyze the critical process parameters of Rubber Injection Moulding: (i) Injection Pressure and (ii) Mould Temperature.	**07**

OR

Q.5	**(a)**	Define (i) Transfer Pot, (ii) Sprue Bush, and (iii) Cull in the context of transfer moulding.	**03**
	(b)	Differentiate between compression moulding and transfer moulding based on (i) Perform preparation, (ii) Material-flow path, and (iii) Scrap/Cull formation.	**04**
	(c)	Explain the importance of Temperature Control in the Rubber Injection Moulding process.	**07**

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