

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- SEMESTER-IV (NEW) EXAMINATION – WINTER 2024****Subject Code:3142607****Date:26-11-2024****Subject Name:Rubber Rheology****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) Write the significance of Rheology in rubber processing.	03
	(b) Explain the stress response to flow.	04
	(c) Give the difference between Short range motion and Long ranged motion.	07
Q.2	(a) Define the term Stress Tensor.	03
	(b) Give the difference between Eyring and Eyring powell model.	04
	(c) Outline purely elastic behavior of different materials by following the stress-strain curves.	07
	OR	
	(c) Outline purely viscous behavior of different fluids by flowing plots of shear stress vs. shear strain.	07
Q.3	(a) Give the difference between Dilatant and Bingham fluids.	03
	(b) Draw the schematic rheograph for rubber with their nomenclature.	04
	(c) Describe in detail about the Uniaxial and Biaxial Elongational Flow.	07
	OR	
Q.3	(a) What are the effect of molecular weight and molecular structure on viscosity?	03
	(b) State the assumptions implied in the development of Hagen poiseuille law.	04
	(c) Short note on “ Entanglement of Molecules”	07
Q.4	(a) Draw schematic diagram showing flow of falling film.	03
	(b) Write the disadvantages of Plunger Viscometer.	04
	(c) Derive the equation for capillary viscometer.	07
	OR	
Q.4	(a) List out the variable influencing the Rheology of rubber.	03
	(b) Write a brief note on Shear induced crystallization.	04
	(c) Derive the velocity profile equation for flow through annulus.	07
Q.5	(a) Write the equation for “Zero shear viscosity.”	03
	(b) Give the difference between the Thixotropic and Rheopectic fluid.	04
	(c) Explain the effect of temperature on the Rheology of rubbers.	07
	OR	
Q.5	(a) Write the significance of Mooney viscometer.	03
	(b) Write a brief note on Rotational viscometer.	04
	(c) Draw the diagram of Biconical rheometer and explain it in detail.	07
