

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI EXAMINATION – SUMMER 2025****Subject Code: 3162313****Date: 22-05-2025****Subject Name: Kinetics and Rheology of Plastics****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) Define the terms: rate of reaction, molecularity and Order of reaction.	03
	(b) Explain Elementary and Non Elementary reactions with example	04
	(c) Discuss about different type of chemical reactors and their properties.	07
Q.2	(a) Define Reactivity ratio.	03
	(b) Explain Extent of reaction and degree of polymerization.	04
	(c) Explain the Kinetics of free radical polymerization with suitable example.	07
OR		
	(c) Define the Activation Energy and derive the Arrhenius law.	07
Q.3	(a) Give the Definition of Rheology with example	03
	(b) What is melt fracture effect in polymer melt flow.	04
	(c) Discuss the kinetics of Free radical polymerization. & role of Free radical initiator.	07
OR		
Q.3	(a) Give the difference between Molecularity and order of reaction?	03
	(b) Describe stress-strain behavior, of plastics.	04
	(c) Explain about the Pseudo plastic fluids, Dilatants fluids, and Bingham plastic fluid with suitable graph.	07
Q.4	(a) Give the diagram of Burger model and Zener model.	03
	(b) Discuss Spring model and dashpot model.	04
	(c) Explain Maxwell Model for viscoelasticity of plastics.	07
OR		
Q.4	(a) Write about the Weissenberg effect shown by non Newtonian fluids	03
	(b) Write the Boltzmann super position principle..	04
	(c) Discuss the WLF equation in detail.	07
Q.5	(a) Explain effect of temperature and Pressure on the Viscosity.	03
	(b) Write short notes on Die Swell, and Melt fracture.	04
	(c) Describe the Cone and plate viscometer with suitable diagram.	07
OR		
Q.5	(a) Define Capillary force and their importance	03
	(b) Explain Torque rheometers in brief.	04
	(c) Describe the Concentric Cylinder rheometer.	07
