

GUJARAT TECHNOLOGICAL UNIVERSITY**BE- SEMESTER- VI EXAMINATION – SUMMER 2026****Subject Code:3162317****Date:26-05-2026****Subject Name: Plastic Structure and Property Relationship****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) Give difference between thermoplastics and thermosets	03
	(b) How does bond strength affect thermal stability in a polymer material? Explain with suitable examples	04
	(c) Explain the relation of structure of a polymer and its electrical properties	07
Q.2	(a) Give the reason of self extinguishing nature of PVC	03
	(b) Write the effects of plasticization upon structure and behaviour,	04
	(c) Discuss in detail, factors affecting crystallinity	07
	OR	
	(c) Discuss Effect of hydrogen on polymer properties	07
Q.3	(a) Why is PTFE more suitable for manufacture of gears?	03
	(b) Discuss the relation between the structure and the properties of polyacetal resins	04
	(c) Write short notes on (i)Cross linking agents (ii) Colorants on properties of polymers.	07
	OR	
Q.3	(a) Define flexural strength and impact strength	03
	(b) Give the Difference in properties of crystalline and amorphous polymers	04
	(c) Explain how does modulus of elasticity affect the following properties in a plastic material: 1. Average degree of polymerization. 2. Cross linkage. 3. Flexibility of chain 4. Readiness of the chain to crystallize. 5. Orientation of crystallites 6. Branching 7. Polarity	07
Q.4	(a) Define Melting temperature (T_m)	03
	(b) Write the Effect of plasticizers on T_g ,	04
	(c) Explain Chemical properties and Thermal properties of a Polymer on the basis of Chemical bond, Chemical Reactivity, Exposure to energy sources	07
	OR	
Q.4	(a) Define Polarization of light with example in Polymers	03
	(b) Explain Birefringence in Polymers	04
	(c) Write short notes on Effect of polymer structure on electrical properties of polymers and Optical properties of polymers.	07
Q.5	(a) Define Inter-molecular Bonding in Polymers	03
	(b) Explain Effect of hydrogen bonding on melting behavior	04
	(c) Discuss the effect of polarity on Mechanical properties, Thermal properties, Electrical properties, and Optical properties	07

OR

- Q.5**
- (a)** High surface energy and high surface tension is seen in certain polymers due to presence of of which element? Explain **03**
 - (b)** Write short notes on Anti ageing agents, and Flame retardants **04**
 - (c)** How is the structure of a polymer related to its chemical properties? Discuss with examples **07**