Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI- EXAMINATION – SUMMER 2016

Subject Code:162302 **Date:21/05/2016**

Subject Name:Plastic Structure, 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.**

Q.1	**(a)**	Discuss in detail, the effect of carbon on polymer properties	**07**
	(b)	Discuss how the structure of a polymer affects its mechanical properties	**07**
Q.2	**(a)**	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**
	(b)	1. How does modulus of elasticity get affected with the average degree of polymerization? Explain with example 2. Discuss effect of C-O bond on polymer properties	**07**
		or	
	(b)	Discuss how the structure of a plastic material is related to its chemical properties?	**07**
Q.3	**(a)**	[1]Discuss Self Extinguishing nature of PVC. [2] What is the raw material used for the manufacture of Car bumpers. Justify the choice of material.	**07**
	(b)	Discuss in detail, the factors affecting crystallinity	**07**
		or	
Q.3	**(a)**	Explain how the structure of nylons are related to their properties	**07**
	(b)	Discuss the structure and properties of bis-phenol A polycarbonates. What are its important applications.	**07**
Q.4	**(a)**	1. High surface energy and high surface tension is seen in certain polymers due to presence of which element? Explain 2. Discuss effect of amorphous structure on polymer properties	**07**
	(b)	Explain the relation of structure of a polymer and its electrical properties	**07**
		or	
Q.4	**(a)**	Discuss the relation between the structure and the properties of polyacetal resins. Mention the important properties and applications of polyacetals	**07**
	(b)	Discuss Effect of hydrogen on polymer properties	**07**
Q.5	**(a)**	Discuss how molecular weight affects ultimate tensile strength and ultimate elongation in polymeric material	**07**

(b) 1. Discuss relationship between molecular weight and Tg of polystyrene. **07**

2. PE has a Tg of -20deg C. Why is it that it appears to be solid at room temperature?

OR

Q.5 **(a)** A polymer is to be decided for a machine part which undergoes cyclic stresses. What should be the selection criteria? **07**

(b) Fire retardant properties are available in a polymer due to presence of which elements)? Discuss in detail. **07**

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