

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE- SEMESTER-VII (NEW) EXAMINATION – WINTER 2020****Subject Code:2173607****Date:21/01/2021****Subject Name:Product Design Concept: Structures & Additives****Time:10:30 AM TO 12:30 PM****Total Marks: 56****Instructions:**

1. Attempt any FOUR questions out of EIGHT questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

		MARKS
<b>Q.1</b>	(a) Define functionality and Functionality group equivalent.	<b>03</b>
	(b) What do you mean by Spherulite structure? Explain with diagram.	<b>04</b>
	(c) Explain viscometry method with the help of mark-Houwink equation.	<b>07</b>
<b>Q.2</b>	(a) Which technique is available for Tg measurement? Explain in detail.	<b>03</b>
	(b) Give the structural features of polymeric materials.	<b>04</b>
	(c) What is the Tg of PET? Explain effect of Tg on the properties of polymer.	<b>07</b>
<b>Q.3</b>	(a) Define PDI with its Significance.	<b>03</b>
	(b) Give the classification of molecular weight determination techniques.	<b>04</b>
	(c) Explain various effects of processing parameters on the structure of polymeric material.	<b>07</b>
<b>Q.4</b>	(a) How additives will affect the structure and properties of polymers?	<b>03</b>
	(b) Describe the effect of molecular weight on properties of polyolefin.	<b>04</b>
	(c) Suggest any additives which will enhance the plasticity of material and explain its properties as well as applications.	<b>07</b>
<b>Q.5</b>	(a) What do you mean by crystallisability? What are the factors that effect on it?	<b>03</b>
	(b) Explain End Group Analysis method for molecular weight determination.	<b>04</b>
	(c) Give the list of different techniques used for number average molecular weight determination and explain in detail about GPC.	<b>07</b>
<b>Q.6</b>	(a) Enlist different chemical methods used for polymer identification.	<b>03</b>
	(b) Explain polymer degradation along with its types.	<b>04</b>
	(c) Write a short note on cryoscopy method.	<b>07</b>
<b>Q.7</b>	(a) Explain basic principle of Ebullioscopy.	<b>03</b>
	(b) Explain Gradient Elution technique.	<b>04</b>
	(c) What do you mean by SEM? Explain its details with the help of neat diagram.	<b>07</b>
<b>Q.8</b>	(a) Write down the principle behind ultracentrifugation technique.	<b>03</b>
	(b) List out various techniques available for flexible film for food applications. Explain adhesion peel test in detail.	<b>04</b>
	(c) Write down the details of vapour pressure osmometry.	<b>07</b>

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