Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III(New) • EXAMINATION – WINTER 2016

Subject Code:2132301 **Date:02/01/2017**

Subject Name:Introduction to Plastic Material Science

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.**

			MARKS
Q.1		**Short Questions**	**14**
	1	What is Monomer?	
	2	What is Degree of polymerization?	
	3	Addition of plasticizer increases Tg of Polymer. True/False?	
	4	What is functionality?	
	5	What is block copolymer?	
	6	Give structure of a polymer with cis and trans configuration.	
	7	Which polymerization is known as living polymerization technique?	
	8	Give functionality of: CH_3NCO and $C(CH_2OH)_4$.	
	9	Give structure of: Poly vinyl acetate.	
	10	Define: Heterochain polymer.	
	11	What are oligomers?	
	12	What is CMC?	
	13	What are IBM and EBM?	
	14	What are spherulites?	
Q.2	**(a)**	Give difference between bulk and solution polymerization technique.	**03**
	(b)	Give classification of polymers with suitable examples.	**04**
	(c)	How polymers are differing from low molecular weight compound? Differentiate.	**07**
		OR	
	(c)	Which initiators are used for Anionic Polymerization? Explain various steps of Anionic Polymerization.	**07**
Q.3	**(a)**	Explain Polycondensation reaction of ethylene glycol and adipic acid to form polyesters.	**03**
	(b)	Explain relation between: (1) Tg & Molecular weight (2) Tg & Plasticizers.	**04**
	(c)	Explain Free radical Polymerization with its various steps.	**07**
		OR	
Q.3	**(a)**	Explain (1) Hydrolysis (2) Acidolysis.	**03**
	(b)	What are Configuration and Confirmations?	**04**
	(c)	Which polymers are prepared by ring opening polymerization? Explain with suitable example.	**07**

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Q.4	**(a)**	Describe Suspension polymerization technique with advantages and applications.	**03**
	(b)	Give difference between amorphous & crystalline polymers.	**04**
	(c)	What is Tg? Which factors affect the glass transition temperature? Discuss with suitable examples.	**07**

OR

Q.4	**(a)**	Define inhibitors. Which inhibitors are used in polymer? Explain inhibiting action with suitable example.	**03**
	(b)	Give difference between Step and Chain polymerization.	**04**
	(c)	What is monodispersed and polydispersed system? Explain Polydispersity & Molecular weight distribution in polymers.	**07**

Q.5	**(a)**	Discuss: Linear, Branched and cross linked polymer structures.	**03**
	(b)	Calculate Mn & Mw for a polymer consisting of three fractions with molecular weights, 100000, 200000 and 300000. The mole fractions of each of these fractions are found to be 0.2, 0.5 and 0.3 respectively.	**04**
	(c)	What do you mean by stereo regular polymers? Discuss about optical isomerism of polymers with suitable example.	**07**

OR

Q.5	**(a)**	Discuss Polyaddition polymerization with suitable example.	**03**
	(b)	How crystallinity affects properties of Polymer? Discuss.	**04**
	(c)	Calculate the volume and mass crystallinities of a sample of PP of density 910 kg/m^3, assuming that the densities of the crystalline and amorphous regions are 936 & 853 kg/m^3 respectively.	**07**

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