Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III (New) EXAMINATION – WINTER 2015

Subject Code:2132301 Date:/2015

Subject Name: Introduction to Plastic Material Science

Time: 02.30pm to 05:00pm 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	Define: Monomer	1
	2	Give functionality of: $H_2NCH_2(CH_2)_4CH_2NH_2$	1
	3	Isotactic polypropylene is more crystalline as compared to Atatic polypropylene. Say True/False	1
	4	Suspension polymerization is also called_____	1
	5	Define: Organic polymers	1
	6	Is – [-CH_2=CH (C_6H_5)-] n – a homoplymer or copolymer? Write	1
	7	Which compounds are used in Zeigler-Natta catalyst?	1
	8	What is Degree of polymerization?	1
	9	Give structure of : PS, PP	1
	10	Define: Homochain polymer	1
	11	What is Polydispersity Index?	1
	12	Define: Spherulites	1
	13	What is IBM?	1
	14	Mn < Mw: True or False?	1
Q.2	**(a)**	What are initiators? Give various initiators used for free radical polymerization.	**03**
	(b)	Give classification of Polymers giving suitable examples.	**04**
	(c)	Give difference between low molecular weight compound and polymers.	**07**
		OR	
	(c)	Explain: Which initiators used for Cationic Polymerization? Explain various steps of Cationic Polymerization.	**07**
Q.3	**(a)**	Discuss Polycondensation reaction of ethylene glycol and adipic acid to form polyesters.	**03**
	(b)	Differentiate between Configuration and Confirmations.	**04**
	(c)	Give difference between Step and Chain polymerization.	**07**
		OR	
Q.3	**(a)**	Calculate the contour length and the extended chain length of PE Mol. Given: - n =4000 , Bond angle-109°28', Segment length - 1.54 Å.	**03**
	(b)	Explain relation between: (1) Tg & Molecular weight (2) Tg & Plasticizers.	**04**
	(c)	Which are the types of Addition Polymerization? Explain Free radical Polymerization in detail.	**07**
Q.4	**(a)**	Describe Bulk polymerization technique with advantages and disadvantages.	**03**

	(b)	Give difference between amorphous & crystalline polymers.	**04**
	(c)	Define: Glass transition temperature. Explain factors influencing the Glass transition temperature with suitable examples.	**07**

OR

Q.4	**(a)**	Write about: Chain transfer agent.	**03**
	(b)	Explain effect of crystallinity on the properties of Polymer.	**04**
	(c)	Explain Polydispersity & Molecular weight distribution in polymers.	**07**
Q.5	**(a)**	Discuss: Linear, Branched and crooslinked polymer structures.	**03**
	(b)	Calculate Mn & Mw for a polymer consisting of mixture of three monodispersed polymers with molar masses 100000, 250000 and 300000 g/mol in ratio 2:1:1 by number of chains.	**04**
	(c)	Explain Emulsion Polymerization technique with schematic diagram.	**07**

OR

Q.5	**(a)**	Write a note on: Degree of Crystallinity.	**03**
	(b)	Explain (1) Hydrolysis (2) Acidolysis.	**04**
	(c)	What do you mean by stereo regular polymers? Discuss about the optical and geometrical isomerism of polymers.	**07**

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