Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V • EXAMINATION – SUMMER 2013

Subject Code: 152302 **Date: 16-05-2013**

Subject Name: Physics of Plastics

Time: 10.30 am - 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 factors affecting crystallinity	**07**
	(b)	1. Draw Molecular Architectures For Linear, Branched, Crosslinked And Dendritic Conformations 2. Define : Isomerism ; Mesogens ; Rayleigh ratio.	**07**
Q.2	**(a)**	Discuss Boltzmannôs superposition Principle	**07**
	(b)	Discuss Gel permeation chromatography.	**07**
		OR	
	(b)	What is Chain length and contour length? Calculate the chain length and contour length of a PE molecule whose ï C-C- chain is 1.54Aę and bond angle is 109ę 28â. Assume n=20000.	**07**
Q.3	**(a)**	What is intrinsic viscosity ? Discuss Mark Houwink equation and its significance	**07**
	(b)	Discuss maxwellôs model	**07**
		OR	
Q.3	**(a)**	Discuss Size Exclusion Chromatography	**07**
	(b)	1. Discuss Theta Temperature 2. Discuss Radius of gyration.	**07**
Q.4	**(a)**	Discuss polymer dissolution.	**07**
	(b)	Discuss Gaussian distribution	**07**
		OR	
Q.4	**(a)**	Discuss Stereo and Structural Isomerism.	**07**
Q.4	**(b)**	What is flory Huggins theory. Discuss.	**07**
Q.5	**(a)**	What is Gradient elution Technique?	**07**
	(b)	What is Polymer Configuration and Polymer conformation? Suppose we want to develop a polymer blend, do we affect the polymer configuration or conformation. Discuss with examples.	**07**
		OR	
Q.5	**(a)**	Discuss difference between amorphous and crystalline polymers.	**07**
	(b)	What is mean end to end distance? Consider an ideal polyethylene chain with molar mass $M=10^a$ g/mol; where a=6 . Its mean end to end distance is given by $\langle R^2 \rangle = Cb^2N$, where the monomer length is b=2.5Aę and the coefficient C=5.5, Estimate its root end square end to end distance ã$\langle R^2 \rangle$ if the molar mass M_{mon} = 28 g/mol.	**07**

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