Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – I • EXAMINATION – WINTER • 2014

Subject code: 2711607 **Date: 12-01-2015**

Subject Name: Polymer Science and Synthesis of Polymers (PSSP)

Time: 02:30 pm - 05:00 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)	"The physical characteristics of polymer material depend not only on molecular weight and shape, but also on molecular structure." Explain the statement with example and figure.	(07)
	(b)	Give a detailed account of mechanism of free radical polymerization reaction.	(07)
Q. 2	(a)	Discuss the classification of Polymers.	(07)
	(b)	Illustrate giving suitable example, the prerequisite of step wise polymerization and differentiate between chain polymerization and step wise polymerization.	(07)
		OR	
	(b)	Explain the Size – Shape – Structure classification for Molecular characteristics.	(07)
Q. 3	(a)	Stating principle, explain role of either ebulliometry or cryoscopy in determining molecular weight of polymer.	(07)
	(b)	Write the Differences between low-molecular weight mixtures and polymer solution.	(04)
	(c)	State practical significance of molecular weight of polymer.	(03)
		OR	
Q. 3	(a)	Describe the method for determining polymer molecular weight by measuring solution viscosity.	(07)
	(b)	Show molecular weight distribution curve of a polydisperse molecule and explain how polydispersity arises due to variation in degree of polymerization.	(07)
Q. 4	(a)	Discuss emulsion polymerization technique, stating its advantages and disadvantages.	(07)
	(b)	Calculate number average molecular weight, weight average molecular weight and polydispersity index of a mixture of polymer, containing following amount of fractions with respective molecular weights in parenthesis. 1g(20,000), 2g (50,000), 0.5 g(1,00,000).	(07)

OR

Q. 4	**(a)**	Explain geometrical isomerism in polymers taking example of Polybutadiene.	**(07)**
	(b)	Discuss the role of polymer in solid phase peptide synthesis.	**(07)**
Q. 5	**(a)**	"The rate of polymerization is proportional to the square root of the initiator concentration." For which type of polymerization, this statement is correct. Derive kinetic expression in favour of this.	**(07)**
	(b)	Giving chemical reactions, explain modifications in polymer molecule due to presence of various reactive functional groups.	**(07)**

OR

Q. 5	**(a)**	Explain in detail about Flory-Huggins Theory.	**(09)**
	(b)	How Degree of crystallinity is determined ?	**(05)**

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