Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – I • EXAMINATION – WINTER 2012

Subject code: 711607N Date: 16-01-2013

Subject Name: Polymer Science & Synthesis of Polymers

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)** Describe and distinguish between thermosetting and thermoplastics polymers. **(07)**

(b) What is meant by polymerization? Explain addition and condensation polymerization by giving suitable example. **(07)**

Q.2 **(a)** Write about different steps of free radical polymerization process. Explain chain termination in detail **(07)**

(b) Discuss Ring Opening polymerization. **(07)**

OR

(b) Write a note on bulk polymerization technique. **(07)**

Q.3 **(a)** Calculate number average molecular weight of polystyrene which is found to consist following five fractions: **(07)**

Sr. No.	No. of Moles	Molecular Weight
1.	20	10, 000
2.	20	20, 000
3.	20	30, 000
4.	20	40, 000
5.	20	50, 000

Also calculate weight average molecular weight, If the polydispersity index of this polymer is 5.

(b) Compare emulsion and suspension polymerization, clearly indicating advantages and disadvantages of both the techniques. **(07)**

OR

Q.3 **(a)** What is practical significance of molecular weight determination? Give relationship between degree of polymerization and molecular weight. **(07)**

(b) Write a note on ebulliometry or cryoscopy method for molecular weight determination. **(07)**

Q.4 **(a)** Giving chemical reactions of various functional group in a polymer, explain modification of polymers applications. Justify your answer with suitable example. **(07)**

(b) Explain Merriield's automated approach of solid phase peptide synthesis. **(07)**

OR

Q.4 **(a)** Derive a useful expression for the rate of free radical polymerization, using steady state assumption. **(07)**

(b) How the Polymers may be classified on the basis of their mechanical strength & behavior and type of mesomer involved in the Polymer? **(07)**

Q.5 **(a)** Define degradation of a Polymer and discuss what you understand by 'degradation as backbone effects'. **(07)**

(b) What are the natural polymers? Give suitable examples. Describe the manufacturing process of any two of them. **(07)**

OR

Q.5 **(a)** Discuss about Optical Isomerism with examples. **(07)**

(b) Explain the concept of polyfunctionality with help of Carothers' equation. **(07)**

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