

GUJARAT TECHNOLOGICAL UNIVERSITY**BE SEM-III Examination May 2012****Subject code: 132301****Subject Name: Introduction to Plastic Material Science****Date: 15/05/2012****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)** Discuss in detail, difference between Polymers and Low Molecular weight compounds. **07**
- (b)** Give classification of Polymers giving suitable examples. **07**
- Q.2 (a)** Write functionality of the following compounds. **07**
- | | |
|--|--------------------------------|
| i) $\text{HOCH}_2\text{CH}_2\text{OH}$ | v) $\text{CH}\equiv\text{CH}$ |
| ii) $\text{C}_6\text{H}_5\text{CH}_2\text{OH}$ | vi) CH_3NCO |
| iii) $\text{H}_2\text{NCH}_2(\text{CH}_2)_4\text{CH}_2\text{NH}_2$ | vii) $\text{CH}_2=\text{CH}_2$ |
| iv) $\text{HOOCCH}_2\text{CH}(\text{OH})\text{COOH}$ | |
- (b)** Explain Free radical polymerization in detail. **07**
- OR**
- (b)** Differentiate between Free radical, Anionic & Cationic polymerization. **07**
- Q.3 (a)** What is a stereo regular polymer? Explain optical isomerism in detail. **07**
- (b)** (I) A PE Sample of 200 g has been divided into five fractions of different degree of polymerization 10, 20, 30, 40 and 50; each fraction contains equal number of molecules. Calculate the number average and weight average molecular weights of this polymer. **04**
- (II) Explain in brief -Linear, Brached and Crosslinked polymers. **03**
- OR**
- Q.3 (a)** Give difference between amorphous & crystalline polymers. **07**
- (b)** Explain Chain transfer agent in detail. **07**
- Q.4 (a)** Give difference between Step polymerization & Chain polymerization. **07**
- (b)** (I) Define: i) Copolymer ii) Functionality iii) Initiator **04**
- iv) Kinetic chain length.
- (II) Calculate the contour length and the extended chain length of PE **03**
- Mol. Given: $n = 5000$, Bond angle $-109^\circ 28'$, Segment length $-1.54 \text{ \AA}$.
- OR**
- Q.4 (a)** What is Glass transition temperature? Explain factors influencing the Glass transition temperature. **07**
- Q.4 (b)** Discuss practical significance of Polymer molecular weight. **07**
- Q.5 (a)** Give detail description on Polycondensation polymerization. **07**
- (b)** Explain kinetics of Cationic polymerization. **07**
- OR**
- Q.5 (a)** Explain various factors affecting Crystallisability. **07**
- (b)** Explain Polydispersity & Molecular weight distribution in polymers. **07**
