

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-III • EXAMINATION – WINTER 2013****Subject Code: 132301****Date: 07-12-2013****Subject Name: Introduction to Plastic Material Science****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) What are polymers? Give detail classification of polymers with suitable examples. **07**

(b) What are chain and step polymerization? Give difference between them. **07**

Q.2 (a) How polymers and low molecular weight compounds are differing from each other? **07**

(b) List various steps of free radical polymerisation and explain each with suitable example. **07**

OR

(b) Explain various transitions of states associated with low molecular weight compounds and polymeric material. **07**

Q.3 (a) Define Glass transition temperature. Which factors affects the T_g? Explain. **07**

(b) Answer the following: **07**

i) T_g and molecular Weight

ii) T_g and Plasticizers

OR

Q.3 (a) What do you mean by Polydispersity? Explain Polydispersity and Molecular weight distribution in polymers. **07**

(b) Answer the following: **07**

i) Write a note on : Tacticity

ii) Calculate the contour length and the extended chain length of PE
Mol. Given: - n = 4000 , Bond angle - 109°28' , Segment length - 1.54 Å.

Q.4 (a) Which polymerization technique forms CMC? Explain in detail with diagram. **07**

(b) Discuss: Microstructure of polymer chain based on the chemical structure. **07**

OR

Q.4 (a) Explain bulk polymerization technique along with advantages, disadvantages and applications. **07**

(b) Explain cationic polymerization with suitable example. **07**

Q.5 (a) Explain with suitable examples Hydrolysis and Acidolysis of polymers **07**

(b) A polymer sample consists of a mixture of three monodispersed polymer with molar masses 200000, 250000 and 300000 g/mol in the ratio 1:2:1 by number of chains. Calculate M_n, M_w and M_w/M_n. **07**

OR

Q.5 (a) What are Spherulites? Give folding of chains during crystal formation. **07**

(b) Explain glass transition temperature for amorphous, semi crystalline and crystalline polymers with the help of specific volume vs. temperature curve. **07**
