

GUJARAT TECHNOLOGICAL UNIVERSITY**B. E. - SEMESTER – III • EXAMINATION – WINTER 2012****Subject code: 132301****Date: 10-01-2013****Subject Name: Introduction to Plastic Materials****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.

- Q1. a.** Write the differences between the natural and synthetic polymers. What is copolymer? Give two examples **07**
- b.** State the different types of molecular weight (average) of polymers. What is degree of polymerization and give the relationship between the molecular weight of polymer and degree of polymerization
- Q2. a.** What is polydispersity? And explain the molecular weight distribution curve of polymer with a neat diagram.
- b.** Explain the secondary force of polymers with examples.
- OR**
- b.** Polymers inspite of having the same average molecular weight show different property behavior-Explain.
- Q3. a.** What are T_g , T_m and T_f ? Explain the change of state of polymeric material with respect to temperature.
- b.** Draw the specific volume versus temperature curve of crystalline, partially crystalline and amorphous polymers and explain the abrupt change of the curve at T_m .
- OR**
- Q3. a.** What are those factors which can influence the glass transition temperature of polymer?
- b.** Give the relationship between the (i) T_g and molecular weight (ii) T_g and melting point of polymers
- Q4. a.** What is plasticizer? Under which circumstances the plasticizers are used for polymers. Explain the function of plasticizers on polymers.
- b.** Write the differences between amorphous and crystalline polymers? Write the relationship between the solubility parameter and energy of vaporization per unit volume of the liquid and explain.
- OR**
- Q4. a.** Explain the geometrical isomerism of polymers? Write the difference between addition and condensation polymerization
- b.** Write a brief note on the following
1. initiator, 2. inhibitor 3. and chain transfer
- Q5. a.** What is crystallizability? Explain the factors which have effect on crystallizability of polymer.
- b.** Write the reaction mechanism of ring opening polymerization
- OR**
- Q5. a.** Explain the manufacture of PMMA by suspension polymerization technique.
- b.** Explain the pattern of folding of polymer chains which occurs during crystallization? Explain how crystallinity could effect the properties of polymers