

GUJARAT TECHNOLOGICAL UNIVERSITY**B.E. Sem-III(Plastic Technology)Examination December 2009****Subject code: 132301****Subject Name: Introduction to Plastic Material Science****Date: 19 / 12 /2009****Time: 11.00 am – 1.30 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) Give classification of polymers with suitable examples. **07**
 (b) Differentiate between polymers and low molecular weight compounds. **07**
- Q.2** (a) What is tacticity? Discuss with suitable examples. **07**
 (b) What is functionality? Discuss Carother's equation. **07**
- OR**
- (b) Discuss factors affecting Tg. **07**
- Q.3** (a) Fill in the blanks: **07**
1. For polymerization to occur, _____ is the minimum functionality required in the monomer.
 2. Viscoelasticity is defined as _____
 3. _____ is a naturally occurring polymer.
 4. _____ Brownian movements are seen in polymer materials.
 5. Function of initiator is _____
 6. Cellulose nitrate is a _____ polymer.
 7. Difference between rubber and plastic materials is _____
- (b) Define : Resin, plastic, inhibitor, chain transfer agent, contour length, Ionic polymerization **07**
- OR**
- Q.3** (a) Discuss free radical polymerization. **07**
 (b) Differentiate between addition and condensation polymerization. **07**
- Q.4** (a) Discuss states of aggregation in polymers. **07**
 (b) Differentiate between amorphous and crystalline polymers. **07**
- OR**
- Q.4** (a) Discuss mechanical degradation in polymers. **07**
 (b) Discuss ring opening polymerization. **07**
- Q.5** (a) Discuss Mechanism of Ziegler Natta Catalyst [any one] in detail. **07**
 (b) 1. Practical Significance of Polymer Molecular Weight **07**
 2. Write a short note on Polyaddition Polymerisation
- OR**
- Q.5** (a) Differentiate between cationic and anionic polymerization. **07**
 (b) (i) A PVC sample of 100g has been divided into five fractions of different degree of polymerization 5,10,15,20,and 25; each fraction contains equal number of molecules. Calculate the number average and weight average molecular weights of this polymer. **3.5**
 (ii) Calculate the Contour length and the extended chain length of a PE molecule given that: Bond angle: $109\text{deg}.28'$. Segment length: 1.54A , $n=10,000$. **3.5**
