

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI  
(END SEMESTER EXAMINATION)

CLASS: MSC/IMSC/PRE-PHD  
BRANCH: CHEMISTRY

SEMESTER : III/IX/NA  
SESSION : MO/18

SUBJECT: SAC3007 POLYMER CHEMISTRY

TIME: 3 HOURS

FULL MARKS: 60

**INSTRUCTIONS:**

1. The question paper contains 7 questions each of 12 marks and total 84 marks.
  2. Candidates may attempt any 5 questions maximum of 60 marks.
  3. The missing data, if any, may be assumed suitably.
  4. Before attempting the question paper, be sure that you have got the correct question paper.
  5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
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- Q.1(a) Discuss classification of polymers based on various parameters. Give suitable examples for each of them? [6]
- Q.1(b) What are Plasticizers? Write down the characteristic properties and applications of good plasticizer with examples. What are the advantages and disadvantages of using plasticizer? [6]
- Q.2(a) Discuss the mechanism of anionic & cationic polymerization. [6]
- Q.2(b) Explain with graph the effect of substitution and monomer structure on polymerization. [6]
- Q.3(a) What is degree of polymerization? Derive the rate equation for polymerization reaction between adipic acid and hexamethylenediamine. [6]
- Q.3(b) What are the types of copolymers generally observed? Explain kinetics of each type of copolymer from the point of monomer reactivity ratios derived from the terminal model of copolymerization. [6]
- Q.4(a) What are meant by soft, strong and brittle nature of polymers? Explain stress-strain profile for soft and weak, hard and brittle, hard and strong type of polymers along with their example. [6]
- Q.4(b) What is viscosity of a fluid? Explain the difference between Newtonian and non-Newtonian fluids based on its viscous response. [6]
- Q.5(a) What is the glass transition temperature ( $T_g$ )? How it is different from melting temperature? How  $T_g$  of polymer depends on secondary forces, molecular symmetry and chain rigidity? [6]
- Q.5(b) Discuss the strain induced crystallization phenomenon in polymers. [6]
- Q.6(a) What do you mean by fire resistant polymers? Explain giving suitable examples. [6]
- Q.6(b) Discuss the significance of biomedical polymers w.r.to development of contact lens. [6]
- Q.7(a) Why is molecular weight determination of polymers considered an important parameter for polymer characterization? [6]
- Q.7(b) Discuss the molecular weight determination using Osmometer and Gel permeation chromatography. Compare and contrast advantages and disadvantages. [6]

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