

**BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI  
(MID SEMESTER EXAMINATION)**

**CLASS: BE**  
**BRANCH: Chemical Engg.-P & P**

**SEMESTER: V**  
**SESSION : MO/2019**

**SUBJECT : PC5003 MACROMOLECULAR SCIENCE - II**

**TIME: 1.5 HOURS**

**FULL MARKS: 25**

**INSTRUCTIONS:**

1. The total marks of the questions are 30.
  2. Candidates may attempt for all 30 marks.
  3. In those cases where the marks obtained exceed 25 marks, the excess will be ignored.
  4. Before attempting the question paper, be sure that you have got the correct question paper.
  5. The missing data, if any, may be assumed suitably.
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- Q1 (a) Define functionality of a monomer with examples. Determine the average functionality for phenol formaldehyde polymerization. [2]  
(b) In the polymerization of  $\omega$ -hydroxycaproic acid,  $\text{HO}(\text{CH}_2)_5\text{COOH}$ , 2% impurity is present. Determine the degree of polymerization and  $M_n$  of the polymer formed. [3]
- Q2 (a) Discuss the uses of Carothers equation. [2]  
(b) Write down the distinctive features of condensation polymerization. [3]
- Q3 (a) Differentiate between chain growth polymerization and step growth polymerization. [2]  
(b) What is kinetic parameter? Evaluate its value for thermal polymerization without initiator. [3]
- Q4 (a) What is inhibition and retardation in radical chain polymerization? [2]  
(b) Discuss the role of chain transfer reactions in addition polymerization. [3]
- Q5 (a) Justify reactivity ratio values for ideal copolymerization and alternate copolymerization. [2]  
(b) How can you evaluate the reactivity ratio? [3]
- Q6 (a) What is azeotropic copolymerization? Explain with suitable diagram. [2]  
(b) How block and graft copolymers are made? Give suitable example. [3]

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