

B. TECH.
(SEM IV) THEORY EXAMINATION 2018-19
POLYMER SCIENCE AND TECHNOLOGY

Time: 3 Hours**Total Marks: 70****Note: 1.** Attempt all Sections. If require any missing data; then choose suitably.**SECTION A**

- 1. Attempt all questions in brief.** **2 x 7 = 14**
- Give classification of co-polymerization.
 - What is the minimum functionality required for a monomer to form a cross-linked polymer?
 - What is polymerization?
 - What do you mean by polymer fracture?
 - What is glass transition temperature?
 - What is photostabilisers?
 - What are conducting polymer?

SECTION B

- 2. Attempt any three of the following:** **7 x 3 = 21**
- Discuss the structure, properties and uses of silicone polymers.
 - Discuss the application of polymers in electronics and medical fields.
 - Explain mechanical degradation and hydraulic degradation of polymers?
 - Discuss determination of molecular weight by sedimentation and viscosity and method.
 - How is the molecular weight of a macromolecule determined by sedimentation velocity method?

SECTION C

- 3. Attempt any one part of the following:** **7 x 1 = 7**
- Write a short note on: i) Bulk polymerization ii) Suspension polymerization
 - Differentiate step growth and chain growth polymerization
- 4. Attempt any one part of the following:** **7 x 1 = 7**
- Write the mechanism of Zeigler-Natta polymerization. What are advantages of this process over free radical polymerization? Write the structures of stereo-regular polymers of poly-propylene.
 - Write are elastomers? Give advantage of vulcanization of natural rubber. Also give synthesis of (i) Neoprene and (ii) Butyl rubber.
- 5. Attempt any one part of the following:** **7 x 1 = 7**
- Provide a complete mechanism for the polymerization reaction of styrene to give polystyrene using benzoyl peroxide as a catalyst. Explain the term "Back biting" as encountered in free radical chain growth polymerization.
 - What are thermosetting polymers? Discuss the preparation and application of (i) Bakelite and (ii) UF resin.
- 6. Attempt any one part of the following:** **7 x 1 = 7**
- Differentiate between photo degradation and degradation by high energy degradation.
 - Equal number of molecules with $M_1=10,000$ and $M_2=1,00,000$ are mixed. Calculate average M_n and M_w .
- 7. Attempt any one part of the following:** **7 x 1 = 7**
- Classify the polymer on the basis of
 - Origin, (ii) Tacticity, (iii) Thermal behavior, (iv) Polymerization.
 - A polymer sample consists of 10% by weight of macromolecules of molecular weight 10000 and 90% by weight of macromolecules with M. Wt. 1,00,000. Calculate the average M_n and M_w .