

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

Time: 3 Hours

Total Marks: 100

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2 x 10 = 20
- a. What are polymeric Composites?
 - b. What is tacticity?
 - c. Write short note on coordination polymerization.
 - d. Give two optical properties of polymer.
 - e. Differentiate between LDPE and HDPE.
 - f. Describe plasticizers material.
 - g. Virgin rubber is like gold explain.
 - h. What you understand by Rheology of polymeric materials.
 - i. What is doped conducting polymer?
 - j. Explain compounding of the resins.

SECTION B

2. Attempt any *three* of the following: 10x3=30
- a. What is polymer processing? Explain injection moulding and draw schematic diagram of an injection-moulding machine.
 - b. What is Silicones? Explain the special properties of silicones used in varied engineering and medical fields
 - c. Write short note on the following
 - (i) Epoxy resins
 - (ii) Urea- Formaldehyde resins
 - d. What are the factors on which the strength and crystalline nature of polymers depend?
 - e. In a monomer $R-CH=CH_2$, if R is an electron donating group, cationic polymerization is favored where as if R is an electron withdrawing group anionic polymerization is favoured why?

SECTION C

3. Attempt any *one* part of the following: 10x1=10
- a. Explain how end group and colligative properties can be determining molecular weight during characterization polymers.
 - b. Discuss the preparation, structure and technical application of SBR
4. Attempt any *one* part of the following: 10x1=10
- a. Distinguish between thermoplastic and thermosetting polymers. Give two examples for each type.
 - b. Calculate the maximum percentage of sulphur that can be present in vulcanized rubber.

5. Attempt any *one* part of the following: 10x1=10

- a. Provide a complete mechanism for the polymerization reaction of styrene to give polystyrene using benzyl peroxide as a catalyst. Explain the term “Black Biting” as encountered in free radical chain growth polymerization and its consequences.
- b. If polymer sample has population as:
10 molecules of molecular mass each = 5,000
20 molecules of molecular mass each = 7,500
20 molecules of molecular mass each = 10,000
25 molecules of molecular mass each = 15,000
20 molecules of molecular mass each = 20,000
5 molecules of molecular mass each = 25,000
Calculate its number average and weight average- molecule mass of polymer.

6. Attempt any *one* part of the following: 10x1=10

- a. Describe kinetics of chain polymerization by free radicals. Obtain expression for rate of polymerization
- b. Write a brief note on the application of polymers in space and in building construction. Describe the preparation and application of Bakelite.

7. Attempt any *one* part of the following: 10x1=10

- a. Write mechanism of zeigler natta polymerization what are the advantages of this process over free radicals polymerization. Write the structure of stereo-regular polypropylene.
- b. Why monomer used in step growth polymerization yield long chain polymers? What polymer is formed when-
- Adipic acid reaction with 1,6-diamino hexane
 - Terephthalic acid reacts with ethylene glycol