Sub Code:ROE035

Paper Id: 199306 Roll No:

B TECH
(SEM III) THEORY EXAMINATION 2019-20
POLYMER SCIENCE AND TECHNOLOGY

Time: 3 Hours *Total Marks: 70*

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

SECTION A

1. Attempt *all* questions in brief. **2 x 7 = 14**

a. Classify polymers on the basis of tacticity.
b. Why do polymers possess an average molecular weight?
c. Distinguish between block and graft copolymers
d. Describe the term TGA and DTA.
e. Discuss two electrical properties of polymers.
f. Define the following: (1) Elongation (2)Toughness
g. Distinguish between chain growth and step growth polymerization.

SECTION B

2. Attempt any *three* of the following: **7 x 3 = 21**

a. A polymer sample contain 20 molecule of molecular weight 10000,25 molecules of molecularweight 20000,15 molecule of molecular weight25000, Calculate the number average and weightaverage molecular weight of the polymer.
b. Describe oxidative and hydrolytic degradation of polymer.
c. Explain the mechanism of co-ordination polymerization.
d. Explain flow of behaviour of polymer with the help of Hook's equation.
e. Differentiate the following: (i) Thermoplastic and Thermosetting
(ii) Homopolymer and Copolymer.

SECTION C

3. Attempt any *one* part of the following: **7 x 1 = 7**

(a)What are the factors on which the strength and crystalline nature of polymer depends?
(b) Explain how end group analysis and colligative properties can be used to determine molecular weight during characterization of polymers.

4. Attempt any *one* part of the following: **7 x 1 = 7**

(a) Write brief nots on (i) High performance polymers (ii) additive for polymers
(b) Discuss the mechanism of anionic polymerization. Why this process is also called "LIVING POLYMERISATION"? Explain.

5. Attempt any *one* part of the following: **7 x 1 = 7**

(a) What polymer is formed when (i) Adipic acid react with 1,6-diamino hexane (ii) Terephthalic acid reacts with ethylene glycol. Discuss important applications of the above polymers.
(b) Provide a complete mechanism for the polymerization reaction of styrene to give polystyrene using benzoyl peroxide as a catalyst.

6. Attempt any *one* part of the following: **7 x 1 = 7**

(a) How the molecular weight of polymer determined by sedimentation and viscosity method.
(b) Which type of chain-reaction polymerization is most likely to terminate by coupling? Write termination step reaction by taking a suitable example.

7. Attempt any *one* part of the following: **7 x 1 = 7**

(a) Discuss the application of polymers on agricultural and sport field.
(b) In the monomer R-CH=CH_2, if R is an electron donating group, cationic polymerization is favored, whereas if R is an electron withdrawing group anionic polymerization is favored. Why?

www.aktuonline.com