

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 0931

Roll No.

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B. Tech.

(SEM. III) THEORY EXAMINATION 2011-12

POLYMER SCIENCE AND TECHNOLOGY

Time : 3 Hours

Total Marks : 100

- Note :-** (i) Attempt all questions.
(ii) Be precise in your answers.

1. Attempt any **four** parts of the following : (4×5=20)
- (a) Define and give example for :
 - (i) Phenol formaldehyde
 - (ii) Plasticizers
 - (iii) Step growth Polymerization
 - (iv) Heterochain polymers.
 - (b) Write short notes on :
 - (i) Extrusion technique in plastic technology
 - (ii) Coordination polymerization.
 - (c) What is the difference between organic and inorganic polymer ?
 - (d) Discuss thermal properties of Polymers. How the glass transition temperature can be determined ?
 - (e) What do you understand by :
 - (i) Isotactic chain and
 - (ii) Syndioactive chain ?

(f) What do you mean by strength of Polymer ? Mention various types of strength.

2. Attempt any **two** parts of the following : (2×10=20)

(a) Describe briefly the structure, properties and application of the following organic polymers.

PET, Nylon 6,6, PTFE, and PMMA.

(b) Discuss any "one" method for determining the molecular weight of a given polymer sample.

(c) Discuss the most probable distribution of polymers in the case of condensation polymerization and show that :

$$\overline{M}_w \setminus \overline{M}_n = 2$$

3. Attempt any **four** parts of the following : (4×5=20)

(a) Describe the preparation and uses of :

(i) Polyethylene

(ii) Polypropylene

(b) What is Ziegles-Natta Catalyst ? How they are formed ?

(c) Write the general mechanism of coordination polymerization.

(d) What is the difference between an injection moulding and extrusion machine ?

(e) What is thermoplastic elastomer and give the name of such elastomers ?

(f) Define the following :

(i) Polyvinyl acetate (PVA)

(ii) Styrene-butadiene rubber (SBR).

4. Attempt any **two** parts of the following : (2×10=20)

(a) Define the following :

(i) Elongation

(ii) Toughness

(iii) Polymer fracture

(iv) Synthetic rubber

(b) Discuss various optical and electrical properties of polymer.

(c) How the analysis and testing of polymer can be done by spectroscopic and thermal method ?

5. Attempt any **four** parts of the following : (4×5=20)

(a) Describe the terms :

(i) TGA

(ii) DTA

(iii) X-ray diffraction

(b) What do you understand by :

(i) Linear polyethylene (HDPE)

(ii) Nylon-6

(c) Give the Mechanism of chain growth polymerization.

(d) What are thermoplastics ? Give some example.

(e) Which type of chain-reaction polymerization is most likely to terminate by coupling ? Write termination step reaction by taking a suitable example.

(f) Differentiate between addition and condensation polymers.