

22230

11819

3 Hours / 70 Marks

Seat No.

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- Instructions :**
- (1) All Questions are *compulsory*.
 - (2) Answer each next main Question on a new page.
 - (3) Illustrate your answers with neat sketches wherever necessary.
 - (4) Figures to the right indicate full marks.
 - (5) Assume suitable data, if necessary.
 - (6) Use of Non-programmable Electronic Pocket Calculator is permissible.
 - (7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. Attempt any FIVE of the following :

10

- (a) Define natural and synthetic polymer.
- (b) Enlist any two organic and inorganic polymer.
- (c) Define homopolymer and copolymer.
- (d) Define addition and condensation polymerization.
- (e) Determine the molecular weight of $R-(CH_2-CH_2)_{700}-R$
- (f) Define glass transition temperature.
- (g) List any two antioxidants with their structure.

2. Attempt any THREE of the following :

12

- (a) Compare thermoplastics and thermosetting plastics based on their properties.
- (b) Illustrate termination step by disproportion and coupling with suitable example.
- (c) Explain the concept of chain transfer in polymerization.
- (d) Explain the importance of polymer molecular weight.

- 3. Attempt any THREE of the following : 12**
- (a) Describe with neat sketch random copolymer and alternate copolymer.
 - (b) Explain cationic polymerization with suitable example.
 - (c) Explain the reason for polymer being known as a polydispersed system.
 - (d) Describe anionic polymerization with suitable examples.
- 4. Attempt any THREE of the following : 12**
- (a) Explain step polymerization with example.
 - (b) Compare bulk and suspension polymerization technique with respect to its salient features.
 - (c) For number average molecular weight, show that $\bar{M}_n = \sum n_i m_i / \sum n_i$
 - (d) Explain the relation of melting point and glass transition temperature of symmetrical and asymmetrical polymer.
 - (e) Describe mechanical degradation of polymer. State the example for the same where it is advantageous.
- 5. Attempt any TWO of the following : 12**
- (a) Classify the polymers with suitable examples.
 - (b) Explain Co-ordination polymerization with respect to initiation, propagation and termination steps.
 - (c) Explain effect of plasticizer on glass transition temperature with figure.
- 6. Attempt any TWO of the following : 12**
- (a) Compare solution and emulsion polymerization technique. (any six points)
 - (b) If a polymer sample has the population as under
05 molecules of molecular weight each = 8000
10 molecules of molecular weight each = 5000
10 molecules of molecular weight each = 7000
15 molecules of molecular weight each = 10,000
10 molecules of molecular weight each = 12,000
05 molecules of molecular weight each = 15,000
Calculate the number average molecular weight and weight average molecular weight.
 - (c) Describe with neat sketch
 - (i) Chain-end polymer degradation
 - (ii) Random polymer degradation
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