

17446

21819

3 Hours / 100 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 answer 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.
 - (8) Abbreviations used convey usual meaning.

Marks

1. **Answer any FIVE of the following :** **20**
- a) Classify the polymers with example.
 - b) Explain initiation mechanism in free radical polymerization.
 - c) List four merits of bulk and emulsion polymerization technique each.
 - d) Show that $\bar{M}_w = \frac{\sum n_i M_i^2}{\sum n_i M_i}$ for weight average molecular weight.
 - e) Explain effect of molecular weight on glass transition temperature of a polymer with a diagram.
 - f) Explain with an example thermal degradation of a polymer. How can it be prevented?
 - g) Explain chain transfer reaction with examples.

P.T.O.

2. Answer any FOUR of the following : **16**

- a) Compare thermoplastics and thermosetting plastics. Give an example of each.
- b) What are inhibitors? List any two inhibitors at what dosages are they used.
- c) Compare merits of solution and suspension polymerisation technique.
- d) If a polymer sample has population as under.

05 molecules of molecular weight each	10,000
10 molecules of molecular weight each	12,500
10 molecules of molecular weight each	15,000
15 molecules of molecular weight each	20,000
10 molecules of molecular weight each	25,000
05 molecules of molecular weight each	30,000

Calculate the number average molecular weight.
- e) Explain the effect of melting point on glass transition temperature of a polymer.
- f) Explain with an example UV degradation of polymer. How can it be prevented ?

3. Answer any FOUR of the following : **16**

- a) Explain schematically the block and random copolymers.
- b) What is co-ordination polymerization? Explain it with examples.
- c) Describe suspension polymerisation of styrene.
- d) Explain sedimentation method for determination of average molecular weight of a polymer.
- e) Explain polycondensation polymerisation with an example.
- f) Describe osmosis method for determination of average molecular weight of polymer.

4. Answer any FOUR of the following : **16**

- a) Differentiate homopolymer and co-polymer with examples. Why are copolymers, popular?
- b) Define functionality. Explain its importance.
- c) Compare demerits of emulsion and bulk polymerization technique.
- d) Show that $\bar{M}_n = \frac{\sum n_i M_i}{\sum n_i}$ for number average molecular weight.
- e) Explain propagation mechanism in free radical polymerisation.
- f) Explain cryoscopic method for the determination of the average molecular weight of a polymer.

5. Answer any FOUR of the following : **16**

- a) Explain schematically alternate and graft copolymer.
- b) Explain co-polycondensation polymerisation with example.
- c) Explain schematically the formation of micelles in emulsion polymerization techniques.
- d) Explain principle of end group analysis.
- e) Explain importance of glass transition temperature.
- f) Describe with an example oxidative degradation of a polymer. Name a type of additive to control it.

6. Answer any FOUR of the following : **16**

- a) Explain the terms: commodity and engineering plastics. Give their examples with one application of each.
- b) Explain principle of ionic polymerisation.
- c) Define surfactants. Explain their role in emulsion polymerisation.
- d) Explain viscometry method for determination of average molecular weight of a polymer.

OR

Draw schematic diagram of 'Ostwald' viscometer. State precautions to be taken in its use.

- e) Explain with a diagram the effect of plasticizers on glass transition temperature.
 - f) Explain mechanical degradation of a polymer how it can be prevented.
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