

17446

11819

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) Figures to the right indicate full marks.
  - (4) Use of Non-programmable Electronic Pocket Calculator is permissible.
  - (5) Abbreviations used convey usual meaning.

**Marks**

1. Answer any FIVE :

5 × 4 = 20

- (a) Define elastomers. State general characteristics of elastomers.
- (b) Describe 'Step polymerisation'.
- (c) Distinguish between emulsion polymerisation and suspension polymerisation.
- (d) Explain Bulk polymerisation technique.
- (e) Explain use of ebulliometry to determine  $\overline{M}_n$  (Average molecular weight) of polymers.
- (f) Describe method of sedimentation to determine average molecular weight of polymer.
- (g) Under which conditions, does PVC degrade ? Name type of its degradation.  
Name stabilisers used to control degradation of PVC.

**2. Answer any TWO :****2 × 8 = 16**

- (a) Explain tonic polymerization with suitable reaction. Write temperature condition and catalyst used in ionic reactions.
- (b) In relation to emulsion polymerisation :
- (i) Define : **2**
- (1) Micelle
- (2) CMC
- (ii) Explain necessity to use preservatives. Name two preservatives used. **3**
- (iii) Explain with two examples, role of protective colloids. **3**
- (c) (i) What is glass transition temperature ? List the factors influencing the glass transition temperature.
- (ii) State the importance of glass transition temperature.

**3. Answer any TWO :****2 × 8 = 16**

- (a) (i) Define : **2**
- (1) Homopolymer
- (2) Co-polymer
- (ii) Explain the terms : **6**
- (1) Block co-polymer
- (2) Random co-polymer
- Represent them schematically.

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- (b) Define chain transfer reaction. Explain with reactions, ways in which chain transfer of growing polymer chain can occur with
- Monomer
  - Initiator
  - Solvent
- (c) (i) A polymer has two fractions in 1 : 2 weight proportions and  $M_1 = 10000$  and  $M_2 = 40000$ . Find  $\bar{M}_w$ .
- (ii) Define  $\bar{M}_n$ . Write mathematical expression for it. Which of the two  $\bar{M}_n$ ,  $\bar{M}_w$ ; is higher? Name a method to determine  $\bar{M}_w$ .

4. Answer any TWO :

2 × 8 = 16

- (a) Explain initiation, propagation and termination with respect to free radical polymerization technique.
- (b) Explain effect of
- Molecular weight of a polymer,
  - Plasticiser – on  $T_g$  of the polymer.
- (c) (i) Describe with an example, mechanical degradation of a polymer.
- (ii) How it can be prevented?

P.T.O.

**5. Answer any TWO :****2 × 8 = 16**

- (a) (i) Explain general characteristics of thermosetting plastics. Name two such plastics.
- (ii) Define and give two examples each of :
- (1) Commodity plastics
  - (2) Engineering plastics
- (b) Distinguish between :  
Addition – and condensation – polymers (polymerisation) – Give two examples each of such polymers.
- (c) (i) Draw a labelled diagram of an Ostwald's Viscometer. State precautions to be taken in its use. 4
- (ii) How average molecular weight is determined of a polymer by end group analysis ? 4

**6. Answer any FOUR :****4 × 4 = 16**

- (a) Define a fibre. State property requirements for a fibre. Name me synthetic and one natural fibre.
- (b) Explain co-ordination polymerisation.
- (c) Write stepwise procedure to conduct solution polymerisation of styrene.
- (d) State merits of solution polymerisation over mass-polymerisation.
- (e) Explain cryoscopy method for determination of average molecular weight of a polymer.
- (f) Explain ultracentrifugation method for determination of average molecular weight of polymer.
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