

# 17446

14115

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.

**Marks**

**1. Answer any TEN :**

**(10 × 2) = 20**

- (a) Define commodity plastic. Name any two types of commodity plastic.
- (b) Define : (i) Polymer (ii) Monomer
- (c) Define an elastomer. Name two elastomers.
- (d) Name an engineering plastic. State its two uses.
- (e) Define Copolymerization. Give an example of a terpolymer.
- (f) Why is polymer formed by anionic polymerization called 'Living polymer' ?
- (g) What is chain transfer agent ? Give two examples.
- (h) Name the two types of termination method in free radical polymerization.
- (i) Define : (i) emulsoid (ii) suspensoid
- (j) What is Critical Micelle Concentration (CMC) ? When is Micelles formed in emulsion polymerization ?
- (k) What is K value ? Name the polymer for which 'K' value is used.



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17446

[ 2 ]

- (l) Define : (i) Relative viscosity (ii) Osmotic pressure
- (m) Explain the principle of measurement of molecular weight of a polymer by cryoscopy method.
- (n) Explain principle of measurement of molecular weight of a polymer by ultra-centrifuge method.

**2. Answer any FOUR :**

**(4 × 4) = 16**

- (a) (i) Name two natural polymers. Write their origin.  
(ii) Define a fibre. Give two examples.
- (b) Define functionality. Explain its importance.
- (c) Distinguish between emulsion polymerization and suspension polymerization.
- (d) Derive the equation to determine number average and weight average molecular weight of a polymer.
- (e) Explain the factors which affect glass transition temperature of a polymer.
- (f) Explain with an example, mechanical degradation of a polymer.

**3. Answer any FOUR :**

**(4 × 4) = 16**

- (a) Differentiate between thermoplastic & thermostat polymer. Give an example of each.
- (b) Compare chain polymerization and step polymerization.
- (c) Explain role of protective colloids in emulsion polymerization. Give two examples of protective colloids used.
- (d) Explain the viscometry method to measure the molecular weight of a polymer.

- (e) Define glass transition temperature. Explain importance of glass transition temperature in case of a polymer.
- (f) Explain with an example oxidative degradation of a polymer. How can it be controlled ?

**4. Answer any FOUR :**

**(4 × 4) = 16**

- (a) Explain formation of a block copolymer. Represent it with a diagram.
- (b) Describe the co-ordination polymerization.
- (c) Name the polymerization technique by which highly pure polymer is obtained. Explain merits and demerits of such technique.
- (d) Explain principle of end group analysis technique of measurement of molecular weight of a polymer.
- (e) How is glass transition temperature is related to (i) molecular weight (ii) plasticizer content in a polymer ?
- (f) Describe the thermal degradation of a polymer.

**5. Answer any FOUR :**

**(4 × 4) = 16**

- (a) Describe with an example, preparation of a graft copolymer.
- (b) Write stepwise method of solution polymerization of an acrylic.
- (c) Describe the concept of molecular weight distribution of a polymer. State its effect on properties of a polymer.
- (d) Explain principle of sedimentation to determine molecular weight of a polymer.
- (e) (i) Define an initiator. Name two types of initiators.  
(ii) Define an inhibitor. Give two examples and level of their use.
- (f) Differentiate between cationic and anionic polymerization.

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

- (a) (i) Draw a simple osmometer.
  - (ii) State requirements of a semi-permeable membrane.
  - (b) Explain 'initiation' and 'propagation' step in addition polymerization.
  - (c) Explain ultraviolet degradation with an example. Give two examples of UV stabilizers.
  - (d) (i) Write Fox's equation as used in calculation of glass transition temperature of a copolymer. Write meaning of abbreviations used.
  - (ii) State meaning of 'soft' monomer and 'hard' monomer.
  - (e) Distinguish : addition polymerization and condensation polymerization.
  - (f) Describe the poly condensation reaction with an example.
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