21718

3 Hours / 100 Marks   Seat No.

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)   Abbreviations carry their usual meanings.

Marks

1.   **Attempt any TEN of the following :**   **20**

(a)   Define organic and inorganic polymer.

(b)   Enlist any four thermosetting plastics.

(c)   Define functionality. State functionality of methylene.

(d)   What do you mean by initiators ? List any two initiators.

(e)   Define homopolymer and co-polymer.

(f)   Write four merits of bulk polymerization technique.

(g)   Write four demerits of solution polymerization technique.

(h)   Write the molecular weight of (i) R [CH_2 – CH] 300^R and (ii) C_4H_8.

(i)   Define the term 'viscosity'. State its unit.

(j)   Define glass transition temperature.

(k)   List the factors which affects the glass transition temperature.

(l)   Write glass transition temperature of PP and PS.

(m)   List any four antioxidants.

(n)   Why photostabilizers are used in plastics ?

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

(a)   List any four engineering plastics with atleast two applications of each.

(b)   Explain chain transfer reaction with an example.

(c)   Explain free radical polymerization.

(d)   Describe the role of surfactants in emulsion polymerization.

(e)   For number average molecular weight, show that $\overline{M_n} = \dfrac{\Sigma\, n_i\, M_i}{\Sigma n_i}$.

(f)   Explain the factors which affects the glass transition temperature of polymers.

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

(a)   Differentiate homopolymers and co-polymers based on the basis of their properties.

(b)   Explain free radical co-polymerization with example.

(c)   Describe polycondensation with suitable example.

(d)   Compare solution and emulsion polymerization based on their merits.

(e)   Explain cryoscopy method for determination of average molecular weight of polymer.

(f)   Describe the effect of melting point on glass transition temperature of a polymer.

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

   (a) Differentiate thermoplastics and thermoset plastics based on their applications.

   (b) Describe cationic polymerization with example.

   (c) Explain co-ordination polymerization with initiation, propagation and termination step.

   (d) Describe bulk polymerization technique.

   (e) Describe osmosis method for determination of average molecular weight of polymer.

   (f) Explain thermal degradation and precaution of polymer degradation.

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

   (a) Classify the polymers with their suitable examples.

   (b) Describe anionic polymerization with suitable example.

   (c) Explain schematically the formation of micelles in emulsion polymerization technique.

   (d) Explain the importance of polymer molecular weight distribution.

   (e) Describe end group analysis method for determination of average molecular weight of polymer.

   (f) Explain schematically random degradation of polymer.

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

(a) Explain schematically (i) alternate co-polymer and (ii) random co-polymer.

(b) Explain step polymerization with example.

(c) Describe suspension polymerization of styrene.

(d) Explain sedimentation method for determination of average molecular weight of polymer.

(e) Calculate the weight, average weight of the total vegetables given in the following table :

Vegetable entity	No. of units in each entity (n)	Weight of each unit M.(g)	Total weight of each unit W = n.M.(g)
Onion	4	10	40
Brinjal	8	20	160
Cabbage	4	100	400
Cauliflower	6	250	1500
	22	–	**2100**

(f) Explain U.V. degradation and prevention of polymer.

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