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# 0806E485

Candidate's Seat No : _____

**M.Sc Sem.-2 Examination**

**P - 408**

**Polymer Science**

**Time : 2-00 Hours]** **June 2022** **[Max. Marks : 50**

Instructions: All Questions in **Section I** carry equal marks
Attempt any **THREE** questions in Section I
Question IX in **Section II is COMPULSORY**

## Section I

| | | |
|---|---|---|
| Q I | A. How tacticity of polymer define its physical property? | 7 |
| | B. Enlist the types of mechanical deformation and explain any one of them. | 7 |
| Q II | A. List out the differences between amorphous and crystalline nature of polymer with one example of each. | 7 |
| | B. Compare conformation and configuration of molecules. | 7 |
| Q III | A. Explain in detail Boltzman principle. | 7 |
| | B. Differentiate between Tg, Tm, & Tc of polymers. | 7 |
| Q IV | A. Explain the basic principle involved in spring and dashpot mechanical model. | 7 |
| | B. Correlate how mechanical properties of polymer depends upon molecular motion in polymers. | 7 |
| Q V | A. Describe stress relaxation phenomena in polymers. | 7 |
| | B. Give views on how viscosity of polymers depends upon molecular motion in polymer. | 7 |
| Q VI | A. Write about potential and conformational energy of molecules of polymers. | 7 |
| | B. Short notes on i) Maxwell element, ii) Voigt kelvin element. | 7 |
| Q VII | A. Differentiate between shear thickening and shear thinning of polymer solutions. | 7 |
| | B. What are the various factors that affect the Tg of polymers? | 7 |
| Q VIII | A. Explain in brief orientation in amorphous and crystalline polymers. | 7 |
| | B. Short notes on isomerism in polymers. | 7 |

## Section II

Q IX 1. ___ is when the polymer chains are aligned parallel to the long axis of the fiber. 1

(a) Crystallinity
(b) Orientation
(c) Amorphous
(d) None of the above

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2. _____ of polymer is often measured as difference between refractive indices for the two rays . 1
   (a) Transmittance
   (b) Birefringence
   (c) Luminescent
   (d) All of the above

3. Crystallization affects _____ properties of the polymer. 1
   (a) Chemical
   (b) Optical
   (c) Mechanical
   (d) All of the above

4. The most significant thermal transition point of polymers include _____. 1
   (a) Melting
   (b) Glass transition temperature
   (c) Both (a) and (b)
   (d) None of the above

5. The microstructure of polymer (sometimes called configuration) relates to the ____ arrangement of monomer residues along the backbone of the chain. 1
   (a) Chemical
   (b) Physical
   (c) Both (a) and (b)
   (d) None of the above

6. Polymer solutions, dispersions, and melts are usually_____ liquids. 1
   (a) Newtonian
   (b) Non-Newtonian
   (c) Both (a) and (b)
   (d) None of the above

7. Birefringence is the _____ property of a material having a refractive index that depends on the polarization and propagation direction of light. 1
   (a) Mechanical
   (b) Chemical
   (c) Optical
   (d) None of the above

8._____ orientation of polymer occurs during blown film extrusion process. 1
   (a) Uniaxial
   (b) Biaxial
   (c) Machining direction
   (d) Transverse direction

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