

Total No. of Questions : 12]

SEAT No. :

P1122

[4659]-330

[Total No. of Pages : 3

B.E. (Polymer Engineering)

POLYMER THERMODYNAMICS AND BLENDS

(2008 Course) (Elective - IV) (Semester - II) (409371 - C)

Time : 3Hours]

[Max. Marks :100

Instructions to the candidates:

- 1) *Answer to the two sections should be written in separate books.*
- 2) *Draw neat diagrams wherever necessary.*
- 3) *Numbers to the right indicate full marks.*
- 4) *Assume suitable data, if necessary.*
- 5) *Use of logarithmic table, electronic pocket calculator is allowed.*

SECTION-I

Q1) a) Explain the following terms: **[12]**

- i) Steady State
 - ii) Equilibrium State
 - iii) Phase Rule
 - iv) Intensive Properties
- b) Describe first law of thermodynamics and State Limitations of The First Law of Thermodynamics. **[6]**

OR

Q2) a) Explain in detail Entropy term and State the Third Law of Thermodynamics. **[9]**

- b) Explain thermodynamic criteria of polymeric dissolution. Describe the condition under which it is not a spontaneous process. **[9]**

Q3) a) Define the excess properties and derive the relation for S^E , G^E , H^E , V^E (S=Entropy, G=Gibbs free energy, H=enthalpy, V=volume and suffix E for excess). **[8]**

- b) Write a short note on effect of molecular weight distribution on phase equilibrium. **[8]**

OR

P.T.O.

- Q4)** a) Write a short note on phase diagram. [8]
b) Describe assumptions of Hildebrand in explaining regular solutions. State its limitations of the theory. [8]

- Q5)** a) Explain with one example: [8]
i) Effect of Hydrogen bonding interaction.
ii) Effect of specific interaction like dipole- dipole interaction.
b) Explain miscibility of blend on the basis of thermodynamic principles. [8]

OR

- Q6)** a) Explain and derive 'Flory Huggins equation for polymer blends'. [8]
b) Explain the role of Hildebrand solubility parameter. [8]

SECTION-II

- Q7)** a) Discuss the advantages and Disadvantages of the following engineering Polymeric modifier: [10]
i) Polycarbonate (PC)
ii) Acrylonitrile Butadiene Styrene (ABS)
iii) Polyethylene Terephthalate (PET)
b) Discuss the following terms with suitable examples: [8]
Ease of processing, Economy, Enhanced Property, Ecology via Polymer Blend Technology.

OR

- Q8)** a) Explain any two methods of preparation of Polymer Blends with suitable example. [9]
b) With the help of two commercial examples, Property advantages and Applications discuss the term Miscible Blends. [9]
Q9) a) Discuss with examples Rubber Toughening of Brittle and Ductile Polymer matrix. [10]
b) Discuss the importance of Maleated Polymer in Polymers Blend Technology. [6]

OR

Q10)a) Discuss Equilibrium Morphology and phase inversion concept in polymer blends. [8]

b) Explain any two methods of characterization (Thermal and Microscopic) of polymer Blends. [8]

Q11) Write a note on: [16]

a) Semi-IPN of PU/PMMA.

b) Compatibilized Blend of PS/PP.

OR

Q12) Explain applicable Rheological models to explain Miscible and Immiscible Polymer Blends. [16]

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