

Major Test - May 2007

PTL 714 : POLYMER BLENDS & ALLOYS

Answer all questions

Max. Marks :100; Time 2 hrs.

- Q.I.** (a) What is porosity model and how is it used to assess stress discontinuity (or stress concentration effect) in polymer blends. [10]
(b) Discuss the role of viscoelastic relaxation in rubber toughening, explaining the limitations imposed by test temperature on it. [10]
- Q.II.** (a) Write equations for 'first' and 'two-thirds' power laws, stating the reasons for their origin. [5]
(b) How would you ascertain which of these two laws shows better agreement with a given experimental data. [5]
(c) Under what conditions there occurs a transition from first power to two-thirds power law in a polymer blend. [5]
- Q.III.** (a) In what respects, the rubber toughening of thermosets differs from that of thermoplastics, and what are the toughening mechanisms, particularly present in case of thermosets. [5]
(b) Describe the overall conclusions about the actually operative toughening mechanisms in rubber toughened epoxy. [10]
(c) Describe the experimental method of making defect free samples of rubber- toughened epoxy. [10]
- Q.IV.** (a) Discuss the need for blending of PVC with other polymers, and describe any three classes of PVC blends which are commercially successful. [10]
(b) Distinguish between 'reactor blending' and 'sequential blending' methods for making PP based blends. [10]
- Q.V.** Give very short answers of the following (not more than 10 lines , or equivalent space in diagram, in any case) [5 x 4]
(a) Draw DSC curves differentiating miscible and immiscible blends)
(b) Methods of compatibilization
(c) Write following equations, defining the symbols used: (i) Nielsen's equation, (ii) Nicholais and Narkis equation and (iii) Piggott and Leidner's equation
(d) Distinguish between, stiffness, hardness, toughness , rigidity.