

Total No. of Questions : 12]

SEAT No. :

P1113

[4659] - 314

[Total No. of Pages : 3

**B.E. (Polymer Engineering)
POLYMER COMPOUNDING
(2008 Course) (Regular) (409361) (Semester - I)**

Time : 3 Hours]

[Max. Marks : 100

Instructions to the candidates:

- 1) *Answers to Section - I and Section - II should be written on separate answer book.*
- 2) *Solve 3 questions from Section -I and 3 questions from Section - II.*
- 3) *Neat diagrams should be drawn whenever necessary.*
- 4) *Figures to the right indicate full marks.*
- 5) *Assume suitable data, if necessary.*
- 6) *Use of electronic pocket calculator is allowed.*

SECTION - I

- Q1)** a) What is the significance of striation thickness in mixing? [4]
b) Write a note on Rheology of Filled Polymers. [7]
c) Give at least two mixing indices and give significance of the same. [7]

OR

- Q2)** a) For a particular compounding operation, it was desired to mix dough in 95 kg batches and then at a later time to blend in 5kg of additive. For product uniformity it is important that the additive be well distributed and so an experiment was set up to follow the course of the mixing. It was desired to calculate the mixing index after 5 and 10 min mixing. Sample compositions, expressed as the percentage of additive in 100 g samples were found to be: [9]

After 5 min,										
(%)	0.0	16.5	3.2	2.2	12.6	9.6	0.2	4.6	0.5	8.5
After 10 min,										
(%)	3.4	8.3	7.2	6.0	4.3	5.2	6.7	2.6	4.3	2.0

- b) Write a note on Dispersive and Distributive Mixing. Give requirements of good mixing. [9]

P.T.O.

- Q3)** a) Explain the characteristics of polymer blend with one example. [3]
b) Discuss with example “Reactive Compatibilization”. [5]
c) Explain miscible and immiscible polymer blends with examples. [8]

OR

- Q4)** a) State and explain two functions of Compatibilizers. [8]
b) Write a note on- [8]
i) Filler Surface Modification
ii) Nano Clay Composites

- Q5)** a) Write a note on the followings: [10]
i) Compounding of any one Polyolefin.
ii) Natural Fiber Filled Polymers.
b) Explain the mechanism of at least one type of UV stabilizer. [6]

OR

- Q6)** a) List various Flame Retardants used and explain the mechanism of working of Flame Retardants. [8]
b) Explain the action of Plasticizers and flow promoters with one example each. [8]

SECTION - II

- Q7)** a) List the various additives used in SBR and EPDM compounding. Explain the function of each additive. [8]
b) List the disadvantages of reactive extrusion. [4]
c) List at least two heat stabilizers used in PVC formulations. Discuss the mechanism of heat stabilizers. [4]

OR

- Q8)** a) What is reactive extrusion? Explain at least two applications of reactive extrusion in details along with the reaction mechanism. [8]
b) Mention the formulation of a low cost dough molding compound using polyester resin. Write down the sequence of addition of the various ingredients. [8]

- Q9)** a) Discuss in details attributes of a good dispersive mixing section. Describe the construction and mixing mechanism of Dray® and Zorro® mixing sections. [9]
- b) Discuss the constructional features and mixing action in variable depth mixing sections with neat figures. [5]
- c) Explain constructional features and mixing action in pin barrel mixing section. [4]

OR

- Q10)** a) Discuss in details the construction and mixing action obtained in planetary gear mixers. [8]
- b) Explain mixing action of blockhead mixing section with neat figure. [5]
- c) Discuss the various flight geometries used to create elongational flow in CRD mixers with neat figures. [5]

- Q11)** a) Explain the following terms with reference to twin screw extruders with neat figures. [8]
- i) conjugated
 - ii) non-conjugated
 - iii) intermeshing and
 - iv) non-intermeshing
- b) Compare single screw extruders and twin screw extruders with reference to [8]
- i) melting mechanism
 - ii) mixing action
 - iii) forward conveying mechanism

OR

- Q12)** a) Discuss in details construction of an internal mixer with a neat figure. Give at least blade designs. Explain how dispersive and distributive mixing is achieved in an internal mixer. [8]
- b) Discuss the mixing mechanism obtained with kneading blocks used in twin screw extruders. [5]
- c) Explain the constructional features of a two roll mill. [3]

