

B. Tech. Seventh Semester (Polymer (Plastic) Technology) (CGS)
11135 : Polymer Reaction Engineering : 7 PP 02

P. Pages : 2

Time : Three Hours



AU - 2940

Max. Marks : 80

- Notes :
1. Answer **three** question from Section A and **three** question from Section B.
 2. Due credit will be given to neatness and adequate dimensions.
 3. Diagrams and chemical equations should be given wherever necessary.
 4. Illustrate your answer necessary with the help of neat sketches.
 5. Discuss the reaction, mechanism wherever necessary.
 6. Use of pen Blue/Black ink/refill only for writing the answer book.

SECTION - A

1. a) Derive the performance of design equation of adiabatic batch reactor. 8
b) Write down material balance equation of plug flow reactor (P.F.R). 5

OR

2. a) Write down features and applications of batch, semibatch and steady state flow type reactors. 7
b) Define the following terms used for steady state flow type reactors with suitable examples. 6
 - i) Space time
 - ii) Space velocity
3. What are the factors responsible for monomer droplets size in suspension or bead polymerisation? Discuss in detail suspension polymerisation technique. 13

OR

4. a) What do you mean by CMC? Explain in detail the role and mechanism of emulsifier in emulsion polymerisation. 7
b) Compare emulsion polymerisation with suspension polymerisation in terms of emulsifier concentration, rate of polymerisation, particle size of polymer formed. 6
5. Discuss Smith and Ewart theory for kinetics of emulsion polymerisation. Derive basic equation of this theory. Apply case in which the number of free radicals per polymer particle are less than one, consider high diffusion rate. 14

OR

6. What are the various stages of an ideal emulsion polymerisation technique? Discuss in brief with the help of neat schematic diagrams. 14

SECTION - B

7. a) Explain stepwise the kinetics of A - R - B type condensation polymerisation and derive the necessary equation. 7

- b) How would you control average molecular weight and molecular weight distribution of polymer in case of condensation polymerisation. 6

OR

8. a) How choice of reactor effect on average molecular weight and molecular weight distribution of polymer formed in case of condensation polymerisation. 7
- b) Name the functional groups present in case of polyester preparation using condensation polymerisation process. 6
9. a) How choice of reactor effect on average molecular weight and molecular weight distribution in case of free radical polymerisation? 6
- b) How would you control average molecular weight of polymer formed using increase in temperature method in case of free radical polymerisation? 8

OR

10. With the help of dilatometer apparatus how would you determine rate of polymerisation and initial rate constant of polystyrene preparation? Describe it's working principle with the help of diagram. 14
11. Describe in detail three different cleaning methods used for large polymerisation reactor. 13

OR

12. a) Discuss material of construction and safety provisions used in large polymerisation reactor. 7
- b) What are the reactor problems observed during handling of highly viscous media? 6

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