



NCE-003-1102003 Seat No. _____
M. Sc. (Sem. II) (CBCS) Examination
April / May - 2017
C-203 : Chemistry
(Macromolecular Physical Chemistry)
(New Course)

Faculty Code : 003
Subject Code : 1102003

Time : $2\frac{1}{2}$ Hours]

[Total Marks : 70

- Instructions :** (1) All questions are compulsory.
(2) All questions carry equal marks.

1 Answer the following : (Any seven)

- (a) Define: Copolymer, elastomers, polycondensation, chain length.
- (b) Give the full forms and repeat unit structures of: PET, PMMA, PS and Teflon.
- (c) Discuss the effect of monomer concentration on direction of polycondensation reaction.
- (d) What is functionality? Discuss different functionality of same compound under different conditions.
- (e) Discuss cross linking.
- (f) Describe curing of epoxy and phenol formaldehyde resins.
- (g) What is the effect of activator concentration on rate of ring scission polymerization and molecular weight of the polymer.
- (h) Discuss solid-phase polymerization.
- (i) Explain Kelen Tuods method for the determination of reactivity ratios.
- (j) What are initiators? Give decomposition of t-butyl hydroperoxide and AIBN.

- 2 Write note on : (any **three**)
- (a) Emulsion polymerization.
 - (b) Gradient elution method.
 - (c) Molecular weight control in polycondensation.
 - (d) Kinetics and mechanism of ring-scission polymerization.
- 3 Answer the following : (any **two**)
- (a) Show that the rate of free radical polymerization is first order with respect to monomer concentration and half order with respect to initiator concentration.
 - (b) Describe gel permeation chromatography method in detail.

OR

- 3 (a) Discuss statistics of linear polycondensation.
- (b) What is degradation? Classify degradation reactions. Explain physical degradation in detail.
- 4 Answer the following : (any **three**)
- (a) Explain coordination polymerization.
 - (b) Discuss fractional precipitation method.
 - (c) Describe melt and interfacial polycondensation methods.
 - (d) What are the factors affecting free radical polymerization and properties of resulting polymers.
- 5 Answer the following : (any **two**)
- (a) Explain :
 - (i) Step-wise polymerization with reference to triisocyanate.
 - (ii) Ring scission polymerization with reference to ethylene oxide.
 - (b) Describe copolymerization behavior when : (i) $r_1=r_2=0$
(ii) $r_1=r_2=1$ (iii) $r_1 > 1$ and $r_2 < 1$ (iv) $r_1 < 1$ and $r_2 > 1$
 - (c) Discuss kinetics of polycondensation reaction.
 - (d) Derive equation for the kinetics of (i) cationic and (ii) anionic polymerization.