



**PAS-003-1102003**

Seat No. \_\_\_\_\_

**M.Sc. (Sem. II) Examination**

**August/September – 2020**

**Physical Chemistry : C-203**

*Macromolecular Physical Chemistry-I*

*(New Course)*

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

[Total Marks : 70

**Instructions :**

- (1) All questions are compulsory.
- (2) Each carry equal marks.
- (3) Each carry 14 marks.

**1** Answer the following : (any seven)

- (a) Explain different functionalities of acetylene and glycerol.
- (b) What are initiators ? Give decomposition of any two initiators.
- (c) What is degradation ? Classify it.
- (d) Give repeat unit structure :
  - (i) Cellulose
  - (ii) PS
  - (iii) PET
  - (iv) PVA
- (e) Discuss intersection method for the evaluation of reactivity ratios.
- (f) Explain interfacial poly condensation.
- (g) Discuss vulcanization of rubber.
- (h) What is the effect of concentration on rate of ring scission polymerization ?
- (i) Discuss poly recombination.
- (j) Define : Polymer, inhibitors, chain length, thermosetting.

**2** Answer the following : (any two)

- (a) Explain : (i) Stepwise polymerization with examples.  
(ii) Methods of initiating free radical polymerization.
- (b) Discuss kinetics of polycondensation reaction in detail.
- (c) Explain different types of chemical degradation with suitable examples.

- 3 Answer the following :
- (a) Explain in detail :
    - (i) Cationic polymerization.
    - (ii) Partial dissolution or extraction method.
  - (b) Discuss molecular weight control in polycondensation reaction.

**OR**

- (a) Derive Mayo equation.
  - (b) Discuss :
    - (i) Non-linear poly condensation.
    - (ii) Coordination polymerization.
- 4 Answer the following :
- (a) Derive an expression for free radical polymerization to show that rate of polymer formation is first order with respect to monomer concentration and half order with respect to initiator concentration.
  - (b) Discuss thermodynamics of ring transformation to linear polymer.
- 5 Answer the following : (any two)
- (a) Describe copolymerization behaviour :  
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  $r_2 > 1$
  - (b) Discuss Gel permeation chromatography.
  - (c) Discuss statistical of linear poly condensation.
  - (d) Discuss kinetics and mechanism of ring scission polymerization.
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