

SEAT No. \_\_\_\_\_

No. of Pages: [03]

[24/A-10]

SARDAR PATEL UNIVERSITY  
M.Sc. CHEMISTRY  
Semester -I, External Examination  
November 25, 2019  
Time: 10:00 am - 01:00 pm  
Polymer Chemistry [PS01ECHE01] (Old Course)

Total Marks - 70

N.B. Figures to the right indicate full marks:

- Q.1 Answer the following multiple choice questions. [08]
- In emulsion polymerisation, the initiator is .....  
(a) Soluble in water (c) Soluble in monomer  
(b) Soluble in both (d) Insoluble in both
  - The turbidity of a polymer solution measures a.....  
(a) Light absorbed by the solution  
(b) Light transmitted by the solution  
(c) Light scattered by the solution  
(d) None of the above
  - Electron releasing groups favour .....  
(a) Cationic polymerisation (c) Anionic polymerisation  
(b) Coordination polymerisation (d) None of the above
  - Molecular weight of the polymer can be controlled by.....  
(a) Chain growth (c) Chain initiation  
(b) Chain transfer (d) Both (a) and (b)
  - A condensation polymer among the following polymer is.....  
(a) Teflon (b) Polystyrene (c) Poly vinyl chloride (d) Dacron
  - If polymer becomes more crystalline, then.....  
(a) It becomes harder (c) It becomes denser  
(b) It becomes more resistant to heat (d) All of the above properties are true
  - Which of the following is an example of Flame retardants?  
(a) Talc (b) Dye (c) Antimony oxide (d) Glycerine
  - Which of the following copolymers is the copolymer which comprises two or more homopolymer sub units linked by covalent bonds?  
(a) Alternating copolymer (c) Periodic copolymer  
(b) Statistical copolymer (d) Block copolymer

**Q.2 Answer the following questions: (Any Seven) [14]**

1. Differentiate between Addition polymerisation and Condensation polymerisation.
2. Ionomers are superior to LDPE. Why?
3. Explain: Inhibitors
4. Give the salient features of cationic polymerisation.
5. Show that bifunctionality in a monomer is a must for the growth of a polymer chain.
6. Write a short note on Glass transition temperature.
7. Write the advantages and disadvantages of suspension polymerisation.
8. How polymer molecules differ from small molecules?
9. How the phenomenon Auto acceleration is generated in bulk polymerisation?

**Q.3**

(A) What are polymers? Classify the polymer based on (i) Mode of synthesis [06]  
(ii) Stereo regularity

(B) Elaborate GPC technique and explain  $\overline{M}_w$  determination from GPC chromatogram. [06]

**OR**

(B) What is the principle of membrane osmometry? Explain the working of membrane osmometer for the determination of average molecular weight of polymer. [06]

**Q.4**

(A) Show that propagation as first order with respect to monomer concentration and half order with respect to initiator in free radical polymerisation. [06]

(B) Describe mechanism of living polymerisation and its chemical kinetics. [06]

**OR**

(B) Answer the following

(i) Name any two initiators for each anionic, cationic and free radical polymerisation. [03]

(ii) Explain the role of chain transfer agent in free radical polymerisation [03]

Q.5

(A) Explain the mechanism of emulsion polymerisation and which polymers are usually obtained by this technique. [06]

(B) (i) Explain : Atom transfer polymerisation. [03]

(ii) Show ring opening polymerisation for caprolactum. [03]

OR

(B) Describe the kinetics of catalysed and non-catalysed polycondensation. [06]

Q.6

(A) (i) Define reactivity ratio. Outline the methods used for determination of reactivity ratio. [03]

(ii) Write a note on organometallic polymer. [03]

OR

(B) Give the detail about the following additives: [06]

(i) Curing agents

(ii) UV stabilizers

(B) Explain in detail about the dissolution for polymer molecules and state the general rules for polymer solubility. [06]

— X —

