

M.Sc.(Chem.) Semester - 2 (CBCS) Examination**April/May-2023 (OLD COURSE)****PHYSICAL CHEMISTRY(CORE)****Time: 2:30 Hours****Marks: 70****Instructions:**

1. All questions are compulsory.
2. Figures to the right indicate marks.

Q.1 Answer the following questions. (Any Seven) (14)

1. Define the term: copolymerisation and chain length.
2. Give the full form and write the repeat units of the following:
(A) PET, (B) Teflon and (C) PS.
3. Give two examples of bi- functional and tri -functional compounds.
4. Distinguish between Syndiotactic and Atactic polymers.
5. Explain: Thermoplastic and Thermosetting polymer
6. Discuss cure reaction with suitable example.
7. Explain non-linear polycondensation.
8. Explain gradient elution technique.
9. Discuss the reaction route of poly-functional compound.
10. What is step-wise polymerisation? Explain with at least three examples.

Q.2 Answer the following questions. (Any Two) (14)

1. Explain Anionic polymerization and its kinetics.
2. Explain chemical degradation and its classification.
3. Describe statistical of linear polycondensation.

Q.3 Answer the following questions. (14)

1. Explain the evaluation of reactivity ratios.
2. Describe kinetics of free radical polymerization.
3. In an experiment, kinetic chain length in presence (v_{tr}) and in absence (v_t) are evaluated at 50° C for vinyl acetate undergoing chain transfer with dimethyl ketone solvent. v_{tr} is 91.3 and v_t is 6642. OR The ratio of $[S]/[M]$ is 0.560. Calculate the chain transfer constant for this reaction.

Q.3 Answer the following questions.

1. Explain:
(I) Kinetics of copolymerisation. (II) Functionality and polymerization concept
2. Give in the brief classification of polymers with example.

Q.4 Answer the following questions. (Any Three) (14)

1. Discuss polymer fractionation by partial dissolution method.
2. Explain addition and substitution reactions.
3. Explain the methods of initiating free radical polymerization.
4. Explain effect of monomer concentration and temperature on direction of polycondensation reaction

Q.5 Answer the following questions. (Any Two) (14)

1. Explain polymer fractionation by Gel Permeation Chromatography method.
2. Describe chain transfer reactions and its kinetics.
3. Explain:
 - (I) Kinetics of ring scission polymerization.
 - (II) Thermodynamics of ring transformation to a linear polymer.
4. (I) Explain the interfacial methods of polycondensation.
(II) A polyester made with equimolar glycol and a dibasic acid is to be stabilized by methanol to obtain $\bar{D}_n = 159$. Calculate amount of methanol to be added.
