

M.Sc.(Chem.) Semester - 2 (CBCS) Examination
March/April – 2024 (As Per Syllabus Year-2023)
Physical Chemistry (Core)

Time: 02:30 Hours

Marks: 70

Instructions:

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

- Q.1 (A) Answer the following. (04)**
- (1) Give the full form and repeating unit structure of PMMA, PAN and Teflon.
 - (2) Differentiate the Syndiotactic polymers from the Atactic polymers.
- Q.1 (B) Answer any two questions out of three. (10)**
- (1) Explain the statistics of linear polycondensation.
 - (2) Discuss the graft and block copolymers reactions.
 - (3) Write a short note on
 - i. Addition and substitution polymer reactions.
 - ii. Effect of monomer concentration and temperature on direction of polycondensation reaction.
- Q.2 (A) Answer the following. (04)**
- (1) Explain the methods of initiating the free radical polymerization.
- Q.2 (B) Answer any two questions out of three. (10)**
- (1) Discuss the kinetics of chain transfer reaction.
 - (2) Explain:
 - i. Coordination polymerisation.
 - ii. Kinetics of anionic polymerisation.
 - (3) A sample of polymer consists of two components present in equal masses, one having $M_1 = 30$ Kg/mol and the other having $M_2 = 12$ Kg/mol. Calculate the mass average and number average molar mass of the polymer.
- Q.3 (A) Answer the following. (04)**
- (1) Explain in short about the Miller Indices.
 - (2) Discuss in short about the quasicrystals.
- Q.3 (B) Answer any two questions out of three. (10)**
- (1) Write a note on
 - i. Metal excess defect.
 - ii. Line defects.
 - (2) Discuss the following crystal types: (a) Metallic crystals (b) Ionic crystals and (c) Covalent crystals.
 - (3) Write a note on the energy band theory of conductors, semiconductors and insulators.
- Q.4 (A) Answer the following. (04)**
- (1) Write a short note on the Zeta potential.
- Q.4 (B) Answer any two questions out of three. (10)**
- (1) Give the comparison between the lyophobic and lyophilic sols.
 - (2) Discuss the Freundlich adsorption isotherm.
 - (3) Write a note on
 - i. Surface active agent.
 - ii. Micellization.
- Q.5 (A) Answer the following (04)**
- (1) Discuss the Lindemann theory for Unimolecular reactions.
- Q.5 (B) Answer any two questions out of three. (10)**
- (1) Write a note on the kinetics of opposing reactions.
 - (2) Discuss the kinetics of fast reaction.
 - (3) Explain the kinetics of Hydrogen-bromine reaction.
