LB—200—2023

FACULTY OF SCIENCE

M.Sc. (First Year) (Second Semester) EXAMINATION

APRIL/MAY, 2023

(NEW/CBCS PATTERN)

CHEMISTRY

Paper-II (CH-423)

(Physical Chemistry)

(Wednesday, 10-05-2023)   **Time : 10.00 a.m. to 1.00 p.m.**

Time—Three hours   *Maximum Marks—75*

N.B. :—   (*i*)   Attempt *all* questions.

       (*ii*)   Use of calculator and log table is allowed.

1.   Solve any *three* :   15

   (*a*)   What is Salt effect ? Explain primary salt effect.

   (*b*)   Explain the probability factors using collision theory of reaction rates. State the limitation of Collision theory.

   (*c*)   The intrinsic viscosity of a solution of polyisobutylene at 25°C is 1.85 cm^3 per gram. Calculate the molar mass of the polymers if the constants 'K' and '*a*' are 3.80×10^{-4} and 0.64 respectively.

   (*d*)   Describe the kinetic of a photochemical reaction between H_2 and Cl_2.

P.T.O.

(e) What is $\overline{M_n}$ and $\overline{M_w}$? Calculate mass average and number average molar mass if equal masses of polymer molecules with $M_1 = 20,000$ and $M_2 = 2,00,000$ are mixed.

2. Attempt any *three* of the following : 15

(a) What is Overpotential ? Explain its applications.

(b) Explain merits and demerits of DME used in polarography.

(c) Differentiate between macro molecules and polymers. Explain liquid crystal polymers.

(d) Explain the theory of double layers of semiconductor solution interface.

(e) What is Concentration polarisation ? Explain its variation with current density in polarography.

3. Attempt the following :

(a) Describe the BET theory for multilayer adsorption. 8

Or

How osmometry method is used to determine molar masses of polymers ? Explain in detail.

(b) Derive Butler-Volmer equation in the kinetics of electrode reactions. 7

Or

Derive Michaelis-Menten equation for enzyme-catalysed reactions. Explain its significance.

4. Attempt the following :

(*a*) Describe fractional change method of rate laws.The rate constant for a second-order reaction is 3.33×10^{-2} dm^3 mol^{-1}s^{-1}. If the initial concentration of the reaction is 0.05 mol dm^{-3}, calculate its half-life. 7

Or

Write an account on corrosion, its various forms, monitoring and prevention method with examples.

(*b*) What is CMC ? Explain the various factors affecting CMC of surfactants. 8

Or

Describe the dynamics of Lindemann's hypothesis in detail.

5. Write short notes on any *three* of the following : 15

(*a*) Oscillatory reactions

(*b*) Applications of polarography

(*c*) Surface films on liquids

(*d*) Surface active agents and classification of surface active agents.