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ST—294—2022

FACULTY OF SCIENCE

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

MAY/JUNE, 2022

(CBCS/New Pattern)

CHEMISTRY

CH-423

(Physical Chemistry-II)

(Monday, 4-7-2022) **Time : 9.30 a.m. to 1.15 p.m.**

Time— 3.45 *Hours* *Maximum Marks*—75

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

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

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

(*a*) Discuss collision theory of reaction rates.

(*b*) Give an account of oscillatory reactions.

(*c*) The intrinsic viscosity of a solution of polyisobutylene at 20ºC is 1.80 decilitre per gm and molecular weight is 6.0×10^5 gm per mol. Determine the constant k if $a = 0.64$.

(*d*) Discuss the kinetics of pyrolysis of acetaldehyde.

(*e*) At 25ºC the plot of $\frac{\pi}{C}$ versus C gave an intercept 3.2×10^{-3} atm kg^{-1}, calculate the molar mass.

P.T.O.

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

(*a*) Discuss exchange current density.

(*b*) State Ilkovic equation and give its significance.

(*c*) Define polymer. Explain isotactic, atactic and syndiotactic polymers.

(*d*) Explain the steam model of electric double layer structure.

(*e*) Write a short note on electrocardiography.

3. Attempt the following :

(*a*) Derive Gibbs adsorption equation. Give its significance. 8

Or

A sample of a high polymer consists of equal number of molecules with M_1 = 15000 and M_2 = 1,50,000, calculate $\bar{M}w$ and $\bar{M}n$.

(*b*) Discuss the theory of double layer in reference to semiconductor electrolyte interfaces. 7

Or

Discuss the kinetics of the reaction between H_2 and Br_2.

4. Attempt the following :

(*a*) A first order reaction has rate constant equal to 1.25×10^{-4} sec^{-1} at 300 K and 8.5×10^{-9} at 320 K. Calculate the activation energy of the reaction. 8

Or

Derive the Ilkovic equation of diffusion current in polarographic cell.

(*b*) Derive Butler-Volmer equation. 7

Or

What is the principle of Polarography ? Explain half wave potential. Give any *three* applications of Polarography.

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

(*a*) Arrhenius equation

(*b*) Critical Micelle Concentration

(*c*) Effect of the solvent on the rate of reactions

(*d*) Surface film on the liquid.