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SA—23—2025

FACULTY OF SCIENCE AND TECHNOLOGY

B.Sc. (Second Year) (Fourth Semester) EXAMINATION

MARCH/APRIL, 2025

(CBCE/New Pattern)

CHEMISTRY

Paper–IX

(Physical and Inorganic Chemistry)

(Saturday, 12-4-2025) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—40

N.B. *:—* (*i*) *All* questions are compulsory.

(*ii*) Figures to the right indicate full marks.

(*iii*) Use of logarithmic table and calculator is allowed.

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

(*a*) Define Pseudo-halogen. Give its preparation and properties.

(*b*) What are inter-halogen compounds ? Explain structure of $X_{1/3}$ type compound.

(*c*) Give preparation, properties and structure of ICl^{-}_{2}

(*d*) What is basic unit of silicate ? Explain its any *two* classifications.

(*e*) Define carbide and discuss its classifications.

P.T.O.

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

(*i*) What is rate of reaction ? Discuss factors affecting rate of reaction.

(*ii*) Derive rate expression for rate constant of second order reaction ($a = b$)

(*iii*) Discuss relaxation effect and electrophoretic effect

(*iv*) Explain the conductometric titration of strong acid *versus* strong base.

(*v*) A certain system absorbs 3×10^{16} quanta of light per second. On irradiation for 20 minutes, 0.002 mole of reactant was found to have reacted. Calculate quantum efficiency of the process.

($N = 6.023 \times 10^{23}$)

3. Solve any *two* of the following : 10

(*a*) What is order of reaction ? Derive first order rate equation.

(*b*) The resistance of N/2 solution of an electrolyte placed between two electrodes which are 1.72 cm apart and have an area 4.5 cm^2 was 25 ohms. Calculate equivalent conductance of the solution.

(*c*) State Kohlrausch law. Explain its any *two* applications

(*d*) Discuss fluorescence and phosphorescence with the help of Jablonski diagram.