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NA—23—2023

FACULTY OF SCIENCE

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

NOVEMBER/DECEMBER, 2023

(New Course)

CHEMISTRY

Paper IX

(Physical and Inorganic Chemistry)

(Thursday, 7-12-2023) **Time : 2.00 p.m. to 4.00 p.m.**

Time—2 *Hours* *Maximum Marks*—40

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

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

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

(*a*) What are interhalogen compounds ? Explain structure of XY_5 type of interhalogen compound.

(*b*) Define fluorocarbon. Write properties and uses of Teflon.

(*c*) Explain strength and stability of oxyacids of halogen.

(*d*) What is silicate ? Write a note on chain silicate.

(*e*) Define Carbide. Write preparation and properties of ionic carbide.

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

(*a*) Derive equation for rate constant of zero order chemical reaction and give its characteristics.

P.T.O.

(*b*) The half-life period of first order reaction is 20 minutes. How long will it take for completion of 40% reaction ?

(*c*) Define the term specific conductance and equivalent conductance. Explain the effect of dilution and temperature on it.

(*d*) State Kohlrausch's law and explain its application in determination of solubility of sparingly soluble salt and in determination of equivalent conductance of weak electrolyte at infinite dilution.

(*e*) Explain the phenomenon of fluorescence and phosphorescence with Jablonski diagram.

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

(*a*) Explain molecularity and order of reaction with suitable examples.

(*b*) A system absorbs 2.0×10^{16} quantum of light per second on irradiation for 20 minutes. 0.002 mole of reactant was found to have reacted. Calculate quantum yield. ($N = 6.023 \times 10^{23}$)

(*c*) Explain conductometric titration of strong acid and weak base.

(*d*) Explain Arrhenius theory of electrolytic dissociation. Give its two limitations.