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PA—11—2024

FACULTY OF SCIENCE

B.Sc. (Third Year) (Fifth Semester) EXAMINATION

MARCH/APRIL, 2024

(CBCS/New Pattern)

CHEMISTRY

Paper-XIII

(Physical and Inorganic Chemistry)

(Monday, 08-04-2024) **Time : 10.00 a.m. to 12.00 noon**

Time—2 *Hours* *Maximum Marks*—40

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

(*ii*) Use logarithmic table and non-programmable calculator is allowed.

1. Answer any *three* of the following : 3×5=15

(*a*) Explain polymerization of W^{6+}.

(*b*) Draw the structure of CrO_4^{2-} tetrahedral heteropoly anion.

(*c*) Explain the structure of isopoly anions of Mo^{6+}.

(*d*) Draw and explain the structure of $Ir(CO)_{12}$.

(*e*) Define isolobal fragments and explain P_4 fragment.

P.T.O.

2. Solve any *three* of the following : 3×5=15

(*a*) Derive the Ilkovic equation for the diffusion current in a polarographic cell.

(*b*) Describe in brief any *two* applications of Polarography.

(*c*) Define magnetic susceptibility, specific susceptibility and give their units.

(*d*) State and explain Raoult's law for vapour pressure of binary solutions of volatile liquids.

(*e*) Derive Gibbs-Duhem-Margules equation.

3. Answer any *two* of the following : 2×5=10

(*a*) Derive an expression for chemical potential for ideal solution.

(*b*) Derive an expression for free energy change of mixing of an ideal solution.

(*c*) Explain the effect of temperature on paramagnetic, diamagnetic and ferromagnetic substances.

(*d*) Explain the principle of Polarography.