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GA—06—2023

FACULTY OF SCIENCE

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

APRIL/MAY, 2023

(Old CBCS Pattern)

CHEMISTRY

Paper XV

(Physical and Inorganic Chemistry)

(Thursday, 20-4-2023) **Time : 10.00 a.m. to 12.00 noon**

Time—Two Hours *Maximum Marks*—40

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

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

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

   (*a*) What is Na^+/K^+ pump ?

   (*b*) Give names of three essential trace elements and three ultratrace elements.

   (*c*) Give an account of myoglobin.

   (*d*) What are boranes ? How are they classified ?

   (*e*) What are carboranes ? Explain properties of carboranes.

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

   (*a*) Give the derivation of Nernst equation for single electrode potential.

   (*b*) State and derive Gibbs-Helmholtz equation.

   (*c*) State and derive Clausius-Clapeyron equation.

P.T.O.

(*d*) Define magnetic susceptibility. Explain the effect of temperature on paramagnetic, diamagnetic and ferromagnetic substances.

(*e*) A zinc electrode is placed in 0.1 m solution of $ZnSO_4$ at 25°. Assuming that the salt is dissociated to the extent of 20% at this dilution. Calculate the potential of this electrode at this temperature. Given : $E^0_{zn}\, 2t / zn = -0.76$ V.

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

(*a*) What is electrolyte concentration cell ? Derive an expression for emf of the concentration cell with transport.

(*b*) State chemical potential. Explain the variation of chemical potential with temperature.

(*c*) The equilibrium constant of a reaction doubles on raising the temperature from 30°C to 40°C. Calculate $\Delta H°$ for the reaction ($R = 8.314\ JK^{-1}mole^{-1}$),

(*d*) Describe Gouy's method for measurement of magnetic susceptibility.