This question paper contains **2** printed pages]

Y—33—2019

FACULTY OF SCIENCE

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

OCTOBER/NOVEMBER, 2019

(CGPA Pattern)

CHEMISTRY

Paper-XV

(Physical and Inorganic Chemistry)

(Monday, 14-10-2019) **Time : 10.00 a.m. to 12.00 noon**

Time—2 *Hours* *Maximum Marks*—40

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

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

(*iii*) Use one answer-book for both sections.

Section A

(Physical Chemistry)

1. Answer any *five* of the following : 5×2=10

(*a*) What is reversible cell ? Give its example.

(*b*) Define single electrode potential and oxidation potential.

(*c*) Calculate the electrode potential of a copper plate dipped in a solution of 0.1 m Cu^{++} ion solution at 25° C. The standard electrode potential of copper is 0.34V.

(*d*) State any *two* statements of third law of thermodynamics.

(*e*) Explain the term partial molar property.

(*f*) Define magnetic susceptibility ? Give its unit.

(*g*) What are paramagnetic substances ? Give its examples.

(*h*) What are the applications of Vant-Hoff's equation.

P.T.O.

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

(*a*) Discuss the conventional representation of electrochemical cells.

(*b*) Derive Gibb's and Helmholtz equation.

(*c*) Describe Gouy's method for the determination of magnetic susceptibility of a substance.

3. Answer any *one* of the following : 1×7=7

(*a*) What is concentration cell ? Derive an equation for emf of concentration cell without transport ? 7

(*b*) (*i*) Derive Clausius-Clapeyron equation for liquid $\rightleftharpoons$ vapour equilibria. Give its applications. 4

(*ii*) The equilibrium constant for a reation is 50 at 1273 K and 25 at 1373 K. Calculate the heat of reaction ? 3

($R = 8.314\ JK^{-1}\ mole^{-1}$).

Section B

(Inorganic Chemistry)

4. Solve any *three* of the following : 3×3=9

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

(*b*) Draw the structure of 1, 2, 1, 7 and 1, 12 dicarbo-closo dodecarboranes.

(*c*) Give the properties of carboranes.

(*d*) Discuss the role of Na^+ and K^+ in the body of living organism.

(*e*) Explain how Nitrogenase converts atmospheric Nitrogen to ammonia.

5. Solve any *two* of the following : 2×2=4

(*a*) Give an account of myoglobin.

(*b*) Give any *two* methods of preparations of diboranes.

(*c*) Describe closocarboranes with suitable example.

(*d*) Write properties of metalloboranes.