R—28—2017

FACULTY OF SCIENCE

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

MARCH/APRIL, 2017

CHEMISTRY

Paper XV (CH-304)

(Physical and Inorganic Chemistry)

(Friday, 24-3-2017)   **Time : 10.00 a.m. to 12.00 noon**

Time—Two Hours   *Maximum Marks—40*

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

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

(iii) Use only one answer book for Sections A and B.

Section A
(Physical Chemistry)

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

    (i)   Explain construction and working of calomel electrode.

    (ii) Calculate the electrode potential of copper wire dipped in the solution of 0.01 M $CuSO_4$ solution at 25°. The standard electrode potential of copper is 0.34 V.

    (iii) Show that decrease in work function gives maximum work done.

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

    (v)   Derive the equation for chemical potential of ideal gas.

    (vi) Define magnetic susceptibility and give its unit.

    (vii) What are ferromagentic substances ? Give examples.

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

    (a) Explain the effect of temperature on paramagnetic and diamagnetic substances.

    (b) (i)   Derive Gibbs' Duhem equation.

         (ii) The equilibrium constant for a reaction is 5×10^2 at 1200 K and 5 at 1000 K. Calculate heat of reaction (R = 8.314 JK^{-1} $mole^{-1}$).

    (c) State the principle of potentiometric titration. Explain Redox potentiometric titration.

P.T.O.

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

   (*a*) Explain Nernst theory of electrode potential. Derive Nernst equation for single electrode potential.

<center>*Or*</center>

   (*b*) Derive Clausius-Clayperon equation. Derive integrated form.

<center>**Section B**</center>

<center>**(Inorganic Chemistry)**</center>

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

   (*a*) What are boranes ? Give their classification.

   (*b*) Describe the structure of dicarba-closododecacarborane.

   (*c*) Give any *two* preparation of metalloborane.

   (*d*) Explain biological role of alkali and alkaline earth metal ion in biological system.

   (*e*) Write note on nitrogen fixation.

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

   (*a*) Diborane is a electron deficient compound. Explain.

   (*b*) What are metallocarboranes ? Give any *one* preparation of it.

   (*c*) Describe closocarborane with suitable example.

   (*d*) Write a note on myoglobin.