B.Sc. 4th Semester Hons (New Scheme) Examination,
May–2016
CHEMISTRY
Paper–CH (H)–207–P-24
Physical Chemistry

Time allowed : 3 hours] *[Maximum marks : 40*

Note : *Attempt **five** questions in all, **Question No. 1 is compulsory.** Select **one** question from each section.*

1. (a) Explain the spontaneity of a process in term of Work function. 1×8=8

(b) Define Thermodynamics.

(c) Which type of process has zero entropy change for universe ?

(d) What is the formula of Clausius Claypeyron equation ?

(e) Write the formula for Nernst equation.

(f) Define Chemical kinetics.

(g) Define Thermodynamic scale of Temperature.

(h) Define Rusting.

Section–I

2. (a) To Prove that

(i) $\Delta S = C_p \ell n \frac{T_2}{T_1}$

(ii) $[\Delta G]_T = nRT \ell n \frac{V_1}{V_2}$

(iii) $\left[\frac{dA}{dT}\right]_V = -S$

(b) To show that Entropy is a state function. 6,2

3. (a) To Prove that :

(i) $-W_{useful} = \Delta G$

(ii) $[\Delta A]_T = nRT \ell n \frac{P_1}{P_2}$

(iii) $\left[\frac{dG}{dT}\right]_P = -S$

(b) To prove that the efficiency of Carnot engine is given by : $\frac{w}{q_2} = \frac{T_2}{T_2 - T_1}$ 6,2

Section–II

4. (a) Explain Gibb's adsorption equation. 4,4

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

5. (a) Derive Clausius Clapeyron equation. 4,4

(b) Explain the variation of chemical potential with pressure.

Section–III

6. (a) Define Electrochemical series. Explain the significance of Electrochemical series. 4,4

(b) Apply Nernst equation on :

(i) Gas metal electrode

(ii) Redox electrode

7. (a) Explain the following :

(i) Over potential

(ii) Polarisation.

(b) Give differences in between Electrochemical cell and electrolytic cell. 4,4

Section–IV

8. (a) How can you determine the pH of the unknown solution using glass electrode. 4,4

(b) Explain the following :

(i) Methods for controlling corrosion

(ii) Factors affecting rate of corrosion.

9. (a) Derive Henderson-Hazel equation to determine the pH of Basic buffer. 2,4,2

(b) How can you determine the pH of the unknown solution using Hydrogen electrode ?

(c) Write a note on Hard sphere model theory.