Roll No. .....

(04/17-I)

5213

B. Sc. EXAMINATION

(Fourth Semester)

CHEMISTRY

CH-205

Physical Chemistry

Time : Three Hours *Maximum Marks :* 26

Note : Q. No. **1** is compulsory. Attempt *two* questions from each Section A and B.

1. (i) If T_1 is 90% of T_2, then what is efficiency of engine ?

   (ii) What is a cyclic process ?

   (iii) What is the criterion of spontaneity in terms of Entropy change ?

   (iv) Define electrode potential.

(v) What do you understand by the term Concentration Cell ?

(vi) Why is voltmeter not suitable to measure EMF of a cell ? 1×6=6

Section A

2. (a) Derive an expression for Entropy change of a ideal gas associated with change in temperature and pressure simultaneously.

(b) Write a short note on Residual entropy with example. 3+2

3. (a) Derive the expression :

$\Delta G = \Delta H + T\left(\frac{\partial G}{\partial T}\right)_P$. By what name this relation is called ? 2½+½

(b) Derive a relation for the criterion of spontaneity in terms of Work Function. 2

4. (a) What do you understand by Nernst Heat Theorem ? Does it apply to all three states Solid, Liquid and Gas equally ?

(b) Derive the thermodynamic expression :

$$P = -\left(\frac{\partial A}{\partial V}\right)_T$$

3+2

Section B

5. (a) What are the various types of reversible electrodes ? Discuss the construction and working of Hydrogen and Chlorine electrodes in detail.

(b) Deduce the relation : 3+2

$$\Delta S = nF\left(\frac{\partial E}{\partial T}\right)_P$$

6. (a) What is electrochemical series ? Discuss its applications.

(b) Write a short note on Electrode concentraction cell without transference.

3+2

7. (a) Discuss, how you will measure pH of a solution using a Glass electrode.

(b) Derive Nernst equation for measurement of emf of a cell. 3+2