

2010 – 2011
B.Sc. (HONS.) (PART – II) EXAMINATION
(CHEMISTRY)
PHYSICAL CHEMISTRY
(CH – 213)

Maximum Marks: 27

Duration: Two Hours

- Note: (i) Answer all questions.
(ii) The terms have their usual meanings.
(iii) Calculator is allowed.

1. Answer any two parts:
- (a) Derive the relations between temperature and volume, and that between temperature and pressure in reversible adiabatic expansion of an ideal gas. (3.5)
 - ✓(b) Derive Kirchhoff's equation to show the temperature dependence of enthalpy. (3.5)
 - (c) One mole of an ideal mono-atomic gas at 27°C expands reversibly and adiabatically from a volume of 10 dm³ to volume of 20 dm³. Calculate the amount of the work done by the gas. (3.5)
2. Answer any two parts:-
- ✓(a) Derive an expression for the entropy of mixing of two ideal gases at a constant temperature. (3.5)
 - (b) Explain the Nernst heat theorem. How does it lead to the enunciation of the Third Law of Thermodynamics. (3.5)
 - ✓(c) Derive an expression for the entropy change accompanying variation of temperature (T) and Volume (V) for an ideal gas. (3.5)
3. Answer any two parts:
- ✓(a) Derive the phase rule and explain various terms involved in it. (03)
 - (b) Draw and describe the phase diagram for two component system in which the two components form a eutectic mixture. (03)
 - ✓(c) Derive Clausius – Clapeyron equation. (03)
4. Answer any two parts:
- ✓(a) What is meant by transport number of an ion? Describe one method for its determination. (3.5)
 - (b) Explain the terms "Asymmetric Effect" and "Electrophoretic Effect" with reference to the Debye – Huckel theory of strong electrolytes. (3.5)
 - ✓(c) Explain the trends of variation of molar conductance with change in concentration for strong and weak electrolytes. (3.5)
 - ✓(d) Describe the working of a metal-insoluble metal salt electrode taking an example. (3.5)
