

31202

**B. Sc. (Pass Course) 3rd Semester
(Regular/Re-appear/Improvement)
(Mercy Chance)**

**Examination – December, 2023
CHEMISTRY - II (PHYSICAL CHEMISTRY)**

Paper : CH-302

Time : Three hours] [Maximum Marks : 30

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all, selecting *one* question from each Unit. Question No. 1 is *compulsory*. All questions carry equal marks.

1. (a) State Joule's law. 1
- (b) Under what conditions, heat absorbed is equal to enthalpy change. 1
- (c) What is effect of temperature on distribution law ? 1
- (d) Define chemical potential. 1
- (e) Define isochoric process. 1
- (f) Which property remains constant when equilibrium is attained ? 1

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UNIT – I

2. (a) What is Joule-Thomson effect ? Define Joule-Thomson coefficient and derive an expression showing relationship of it with enthalpy. 4
- (b) State Zeroth law of thermodynamics. 2
3. (a) How will you differentiate between reversible and irreversible process. 3
- (b) Calculate internal energy change of a system if it loses 400 KJ of heat and has 650 KJ of work done on it. 3

UNIT – II

4. (a) Derive expression of W , q , dU and dH in adiabatic reversible expansion of an ideal gas. 4
- (b) Define bond energy. Why term average bond energy is better than bond energy ? 2
5. (a) Derive thermodynamically the Kirchoff's equation. 3
- (b) One mole of an ideal gas expands from 5 bar to 1 bar at 298 K. calculate work done for reversible expansion. 3

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UNIT – III

6. (a) Derive vant Hoff reaction isotherm. 4
(b) Derive Gibbs- Duhem equation. 2
7. (a) Derive integrated form of Clausius- Clapeyron equation. Give its applications. 4
(b) The standard free energy change for a reaction at 298 K is 28.5 KJ, Calculate the value of equilibrium constant. 2

UNIT – IV

8. (a) How distribution law is modified when solute enters into association with one of the solvent ? 3
(b) Find the solubility of iodine in CCl_4 if the distribution coefficient of iodine between CCl_4 is 120 in favor of CCl_4 . Solubility of iodine in water is 0.7g/L. 3
9. (a) How will you determine degree of hydrolysis of aniline hydrochloride applying the distribution law ? 4
(b) Discuss effect of temperature on distribution law. 2