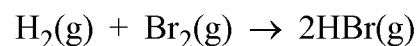


Section II

4. (a) Briefly explain the enthalpy of neutralization. Comment on their values if both are strong or one of them is weak or both are weak. 4

(b) What is thermodynamic basis of Hess law ? 3

(c) Calculate the enthalpy change for the reaction :



Given that bond energy of H-H, Br-Br and H-Br are 435, 192 and 364 KJmol⁻¹ respectively. 3

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B.Sc. (Hons.) (NEP-2020)

EXAMINATION, 2025

(Fourth Semester)

PHYSICAL CHEMISTRY-II

B-23-CHE-402

Time : 3 Hours]

[Maximum Marks : 50

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

Note : Attempt *Five* questions in all, selecting *one* question from each Section. Q. No. 1 is compulsory. All questions carry equal marks.

(Compulsory Question)

1. (a) Explain the term 'osmotic pressure'.
(b) What is Carnot cycle ? Explain.
(c) Explain the term 'bond dissociation energy' ?
(d) What is residual entropy ?
(e) What is molal elevation constant ?

5×2=10

Section I

2. (a) Write an explanatory note on extensive and intensive properties. Give example. **3**

- (b) Enthalpy is a state function. Explain. **3**

- (c) Elaborate first law of Thermodynamics. Write its significance and limitations. **4**

3. (a) What do you understand by internal energy ? Is this a state function ? Explain. **3**

- (b) Calculate ΔU and ΔH for reversible expansion of ideal gas under isothermal condition. **5**

- (c) What are open and closed system ? Explain. **2**

5. (a) Discuss Gibbs Helmholtz equation with regard to its application to a galvanic cell. 3
- (b) Discuss the concept of entropy. Give the effect of temperature on entropy change of mixing. 4
- (c) State and explain second law of thermodynamics. Write its utility and application. 3

Section III

6. (a) State and explain third law of thermodynamics. Write its importance. 3
- (b) Absolute zero cannot be attained. Explain. 2

(c) Calculate absolute entropy of solid, liquid and gases. 5

7. (a) Express the terms Chemical potential. Deduce the expression for chemical potential ideal mixtures. 5

(b) Derive Gibbs-Duhem equation. 5

Section IV

8. (a) Explain van't Hoff theory of dilute solutions. 7

(b) At 298 K, the vapor pressure of water is 23.75 mm of Hg. Calculate the vapor pressure at the same temperature over 3% aqueous solution of urea (NH_2CONH_2). 3

9. (a) What are ideal and non-ideal solutions ? Explain with example. 3

(b) Define Elevation in boiling point of the solvent and determination of molecular weights from elevation in boiling point. 3

(c) Deduce how colligative properties helps to calculate molecular masses for normal, dissociated and associated molecules. 4