BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION SP/2025)

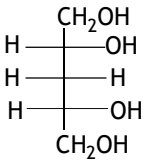
CLASS: BSc **SEMESTER : II**
BRANCH: CHEMISTRY **SESSION : SP/2025**

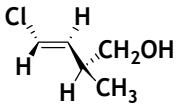
SUBJECT: CH124 BASIC CHEMISTRY II

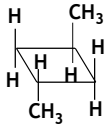
TIME: 02 Hours **FULL MARKS: 25**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates**

			CO	BL
Q.1(a)	Define specific heats 'C_p' and 'C_V' with relevant mathematical expressions.	[2]	I	II
Q.1(b)	Prove that for a system operating at constant pressure, $C_p = \left(\frac{\partial H}{\partial T}\right)_P$.	[3]	I	II
Q.2(a)	Derive the 1st law of thermodynamics. Hence, elaborate the concept of 'Internal energy' (U).	[2]	I	II
Q.2(b)	Taking a suitable example, derive the expression of enthalpy of a reaction in terms of enthalpy of formation of its reactants and products.	[3]	I	II
Q.3(a)	Outline the Joule-Thompson experiment of adiabatic expansion of gas across a pressure gradient.	[2]	I	II
Q.3(b)	Prove that Joule-Thompson expansion is an isenthalpic process (i.e., enthalpy remains unchanged).	[3]	I	II
Q.4(a)	What is optical activity? How it is measured?	[2]	II	I
Q.4(b)	Identify the symmetry elements present in the following molecules H_2O, CH_4, NH_3	[3]	II	II
Q.5(a)	Identify the optically active molecules among the following	[2]	II	II

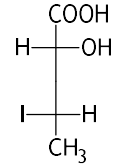
(a) 

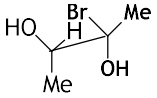
(b) 

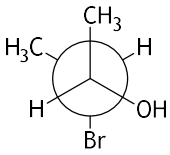
(c) 

Q.5(b) Carry out the following interconversions. [3] II

(a) Fischer to Sawhorse (b) Sawhorse to Newman (c) Newman to Fischer







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