

HBTU Logo	Harcourt Butler Technical University, Kanpur		MID SEM I
Branch	CSE/IT/CE/ME/EE/ET	Program	B.Tech.
Course Name	Engineering Chemistry	Semester	I
Course Code	NCY 101	Year/Session	2025–26
Time: 1 hr		Max. Marks	15
Knowledge Level (KL)	K1: Remembering K2: Understanding	K3: Applying K4: Analysing	K5: Evaluating K6: Creating

Note: Answer all questions. Marks shown against each question.

Q. No	Questions	Marks	COs	KL
1(a)	Define molecular spectroscopy. Explain the different types of transition states with the help of suitable energy level diagrams.	2	CO1	K2 K3
1(b)	What is Beer–Lambert Law? State its mathematical expression and significance. Draw the block/flow diagram of a UV–visible spectrophotometer.	2	CO1	K1 K2
2(a)	Derive rate constant for second order reaction when both the reactants are different.	2	CO2	K5
2(b)	Explain half life time method for determining order of a given reaction.	2	CO2	K3 K4
3(a)	Define enantiomers and diastereomers. How do they differ in terms of physical and chemical properties?	2	CO4	K1 K2
3(b)	What is optical activity? How is it measured, and what does it indicate about a compound?	2	CO4	K1 K5
3(c)	What is the difference between chiral and achiral molecules?	1	CO4	K2
4(a)	Explain the hardness of water. Why do we express hardness in terms of CaCO_3 equivalents?	2	CO5	K1 K2