School of Basic Sciences
Summer Term Examination – July - August 2024

[Programme: B.Sc(Chemistry/ Forensic/ZOO)] [Semester: 4) [Batch:]

Course Title: Quantum mechanics and Analytical Techniques	Max Marks: 100
Course Code:C1UB401B	Time: 3 Hrs.

Instructions:	1. All questions are compulsory.
	2. Assume missing data suitably, if any.

		K Level	COs	Marks
SECTION-A (15 Marks)		**5 Marks each**		
1.	Derive Schrodinger wave equation?	K1	CO1	5
2.	Discuss different spectroscopies based on wavelength of electromagnetic radiation?	K1	CO2	5
3.	Explain Heisenberg's uncertainty principle?	K2	CO1	5
SECTION-B (40 Marks)		**10 Marks each**		
4.	Explain basic principle of Nuclear magnetic resonance spectroscopy?	K3	CO2	10
5.	Discuss different modes of vibration in a molecule with suitable examples?	K4	CO3	10
6.	Explain shielding, de-shielding and chemical shift in NMR with suitable examples?	K3	CO4	10
7.	Discuss what are chromophores, auxochromes, bathochromic and hypochromic shifts in UV-visible spectroscopy?	K3	CO3	10
SECTION-C (45 Marks)		**15 Marks each**		
8.	Explain the effect of H-bonding, conjugation, resonance and ring size on IR absorption of cyclic ketones?	K4	CO4	15
9.	Explain polarizability, pure rotational and pure vibrational spectra of diatomic molecules?	K4	CO2	15
10	Explain Schrodinger's wave equation for H atom with separation of variables?	K4	CO1	15