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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2025

MSc-III Semester (BT)

Course Code (Credits): 20MS1BT312 (2) Max. Marks: 15

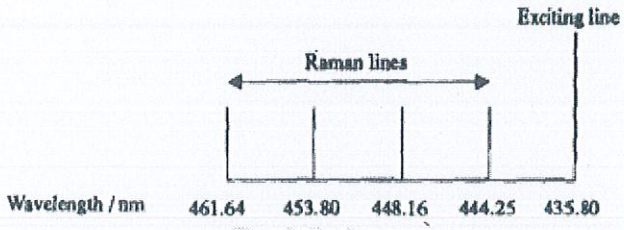
Course Name: Emerging Technology

Course Instructors: Dr. Abhishek Max. Time: 1 Hour

Note: *(a)All questions are compulsory.*

(b)Marks are indicated against each question in square brackets.

(c) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

Q.No	Question	Marks
	The Raman spectra of $CF_4(g)$ was observed using the 435.80 nm Hg exciting energy. Four bands corresponding to the four fundamental vibrations were observed at 444.25 nm, 448.16 nm, 453.80 nm and 461.64 nm. Determine the wavenumbers **(Δν)** of these fundamental vibrations.  What do you understand by stokes and anti-stokes line in raman spectroscopy? Explain with suitable example	4+2
	a. A solution of 3.50 g/L of compound Y in a 1.20 cm cuvette has an absorbance of 0.972 at λmax of 235 nm. Calculate the molar absorption coefficient (ε) for compound Y. Final answer should have the correct number of significant figures and unit. Molar mass of Y = 150.0 g/mol. b. A solution of chemical 'A' having its 0.14 mol L^{-1} concentration has an absorbance of 0.42. Another solution of 'A' under the same conditions has an absorbance of 0.36. What is the concentration of this solution of 'A'?	2.5+2.5
	a. What do you understand by Microscopy? Illustrate with suitable ray diagram. b. How can the resolving powers of two microscopes illuminated by two distinct light sources with wavelengths of 350 nm and 1050 nm, respectively, be compared? In which source you will get higher resolving power and why?	2+2