C.U.SHAH UNIVERSITY Winter Examination-2021

Subject Name: Atomic and Molecular Spectroscopy

	Subject	Code: 4SC05AMS1	Branch: B.Sc. (Physics)	
	Semester	:: 5 Date: 20/12/2021	Time: 11:00 To 02:00 M	arks: 70
	Instruction (1) U (2) I (3) I (4) A	ns: Jse of Programmable calculator & nstructions written on main answe Draw neat diagrams and figures (if Assume suitable data if needed.	any other electronic instrument is prohib by book are strictly to be obeyed. f necessary) at right places.	ited.
Q-1		Attempt the following question	18:	(14)
	 a) b) c) d) e) f) g) h) i) j) k) l) m) n) 	State Moment of Inertia. What are continuous spectra? Give the applications of Spectross What do you mean by harmonic Define: Phosphorescence. Why was B-O approximation pro Write the wavelength range for M What are quantum numbers? What do you mean by tunable las What are Band Systems? Describe Luminescence. Give the reason behind the occur What is fluorescence phenomeno Explain space quantization	scopy. oscillator? ojected? dicrowave region in EM Spectra. ser source? rrence of rotational spectra in atoms/moleon?	cules.
Atte	mpt any f	our questions from Q-2 to Q-8		
Q-2	a)	Attempt all questions Clarify in detail how B-O app energy	proximation was useful in evaluating me	(14) olecular 8
Q-3	b)	Describe salient features of vibra Attempt all questions	tional rotational spectra.	6 (14)
0-4	a) b)	Describe in detail molecule as a Explain briefly the isotope effect Attempt all questions	rigid rotator.	7 7 (14)
Y T	a) b)	Write briefly salient features of r Explain in detail anharmonic frequency.	otational spectra. oscillator with its expression for vib	orational 7



Q-5		Attempt all questions	(14)
c .	a)	Differentiate Infrared spectra and Raman spectra.	7
	b)	Express in detail classical theory of Raman effect.	7
Q-6		Attempt all questions	
-	a)	What is Zeeman effect? Explain Zeeman effect using classical theory.	7
	b)	Discuss salient features of vibrational-rotational spectra.	7
Q-7		Attempt all questions	(14)
	a)	Explain the experimental arrangement needed for Zeeman effect.	8
	b)	Elucidate the quantum numbers also statet heir physical significance.	6
Q-8		Attempt all questions	(14)
	a)	Discuss fluorescence process in detail.	6
	b)	Briefly explain on Raman Spectroscopy.	8

