Enrollment No: _____ Exam Seat No:_____

C.U.SHAH UNIVERSITY

Summer Examination-2016

Subject Name : Chemistry-VI

Subject Code : 4SC03CHE2 **Branch: B.Sc. (Chemistry)**

Semester : 3 **Date : 28/04/2016** **Time : 02:30 To 05:30** **Marks : 70**

Instructions:

(1) Use of Programmable calculator & any other electronic instrument is prohibited.
(2) Instructions written on main answer book are strictly to be obeyed.
(3) Draw neat diagrams and figures (if necessary) at right places.
(4) Assume suitable data if needed.

Q-1 **Attempt the following questions:** **(14)**

a) Arrange the following radiations in their increasing order of energy: Visible, IR, Microwave, Radio. **(1)**

b) What is the application of electron energy loss spectroscopy? **(1)**

c) What are the different types of molecular rotors based on symmetry of their structure? **(1)**

d) What is Beer-Lambert law? **(1)**

e) Why do we get band instead of line spectra in IR spectroscopy? **(1)**

f) What is the primary application of IR spectroscopy? **(1)**

g) What is K-band in UV-Visible spectroscopy? **(1)**

h) What is the application of Fourier Transform calculations on the time domain spectra of any molecules? **(1)**

i) What is the characteristic absorption band in the IR Spectra of organic compound containing hydroxyl and nitrile group? **(1)**

j) What is quenching of fluorescence? **(1)**

k) Write the mathematical expression of fundamental IR equation. **(1)**

l) What is static quenching in fluorescence spectroscopy? **(1)**

m) Define singlet ground state. **(1)**

n) What is the basic difference between doublet state and triplet state? **(1)**

Attempt any four questions from Q-2 to Q-8

Q-2 **Attempt all questions** **(14)**

a) Explain the principle of spectroscopy associated with transition of atoms or molecules between ground and excited states. **(7)**

b) What is spectroscopy? Explain different criteria for classification of spectroscopy? **(7)**

Q-3 **Attempt all questions** **(14)**

a) Write a note on rotational and vibrational spectroscopy. **(7)**

	b)	What is Raman effect? Explain different process involved during collision between a vibrating molecule or lattice and an incident photon.	**(7)**
Q-4		**Attempt all questions**	**(14)**
	a)	Discuss different parameters responsible for shifting of the band in UV-Visible Spectroscopy.	**(7)**
	b)	Write a note on principle of UV-Visible Spectroscopy. Explain the changes observed in the electronic energy levels, when an unsaturated organic molecule is irradiated with UV-Visible radiation?	**(7)**
Q-5		**Attempt all questions**	**(14)**
	a)	Explain the instrumental setup of UV-Visible Spectroscopy.	**(7)**
	b)	What are the differences between IR and Raman spectroscopy?	**(7)**
Q-6		**Attempt all questions**	**(14)**
	a)	What is Fourier Transform technique in Infrared spectrometer? Draw and explain suitable block diagram.	**(7)**
	b)	Why do we observe less number of bands in the IR spectra of CO_2? Explain the effect of coupled interaction and Fermi resonance in the IR spectra of CO_2.	**(7)**
Q-7		**Attempt all questions**	**(14)**
	a)	Explain the effect of H-bonding in the IR spectra of organic molecules containing hydroxyl group.	**(7)**
	b)	What is fluorescence? Draw and explain the Jablonski diagram.	**(7)**
Q-8		**Attempt all questions**	**(14)**
	a)	Write a note on resonance energy transfer, fluorescence lifetime and quantum yields.	**(7)**
	b)	Explain different types of fluorescence and quenching of fluorescence.	**(7)**