Sanjay Ghodawat University, Kolhapur

2020-21

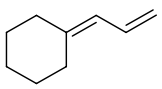
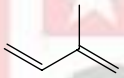
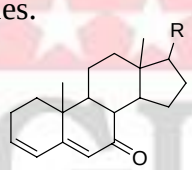
Established as State Private University under Govt. of Maharashtra. Act No XL, 2017

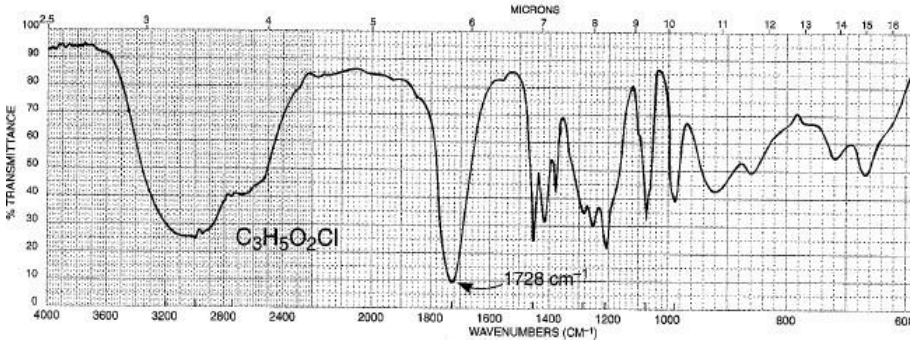
EXM/P/09/00

Year and Program: 2020-21; S.Y.MSc Chemistry (Organic & Analytical)	**School of Science**	**Department: Chemistry**
Course Code: CHS603	**Course Title: Advanced Spectroscopic Methods**	**Semester : III**
Day : Monday **Date : 21.12.2020**	**End Semester Examination**	**Time : 2 Hrs.** **Max Marks : 50**

Question Paper

Instructions: 1) All Questions are compulsory.

		Marks	Bloom's Level	CO
Q.1	**Answer the following (any Two)**–			
a)	Calculate λ_{max} for following molecules. i)  ii)  iii) 	8	1	CO1
b)	i) A substance has molecular formula C_4H_9N. Is there any possibility that this substance has a triple bond? Give reason for your answer. ii) Calculate degree of unsaturation for $C_5H_3ClN_4$ & $C_4H_4BrNO_2$	8	1	CO2
c)	List any four fundamental modes of vibrations when molecule is irradiated with IR. Explain with example how we get IR spectrum?	8	1	CO1
Q.2	**Answer the following (any two) –**			
a)	i) Take an account of effect of hybridization of carbon on C-H bond stretching frequency in IR spectrum. ii) For a compound with MF $C_3H_5O_2Cl$ has following is IR spectrum. What is possible structure of this compound?	8	2	CO4

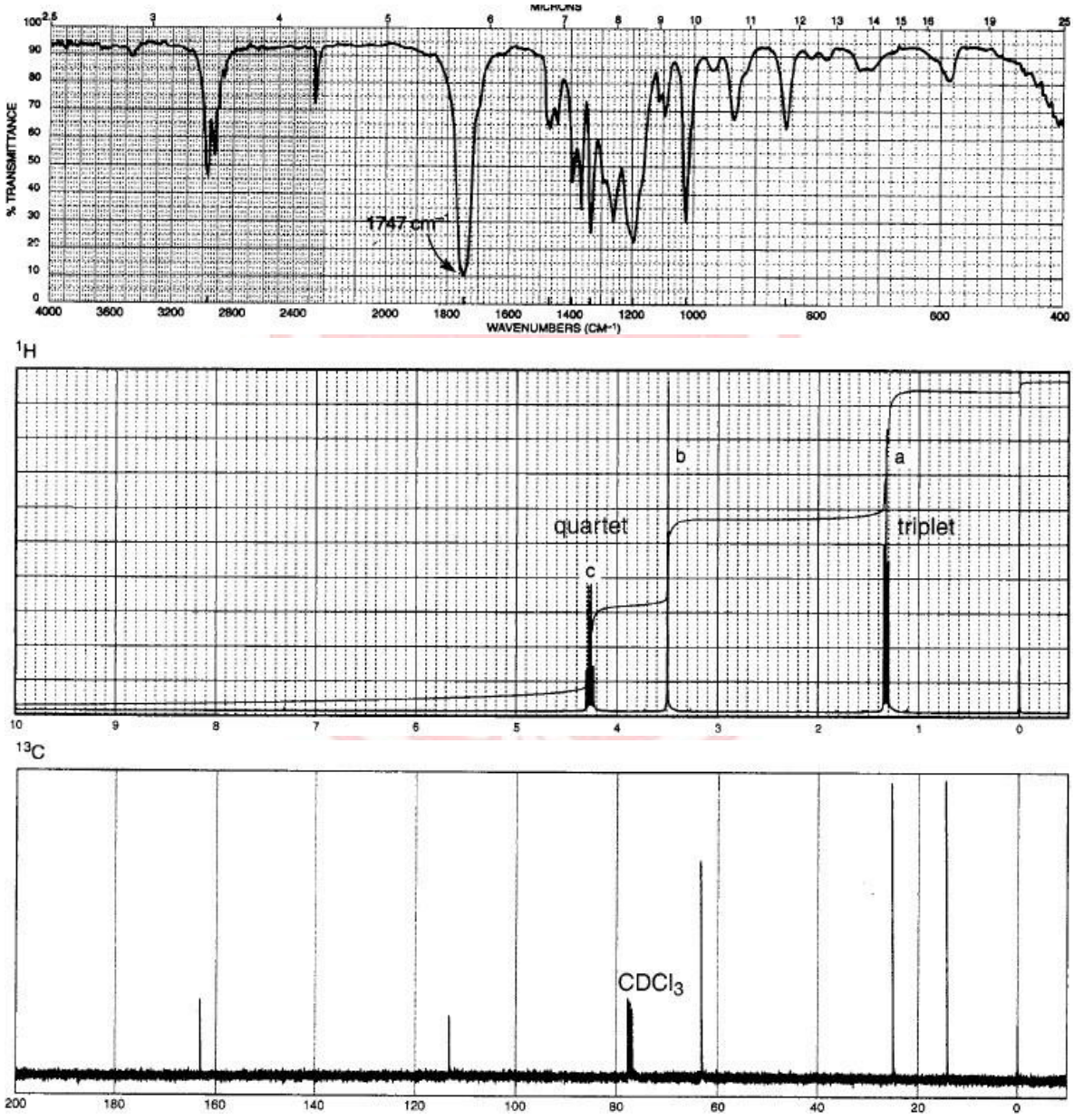


b) Write note on following 8 2 CO4

i) Spin-spin splitting;

ii) Diamagnetic anisotropy.

c) A compound with MF $C_7H_7NO_2$ has following spectra. Identify structure of this compound and justify your answer. 8 3 CO3



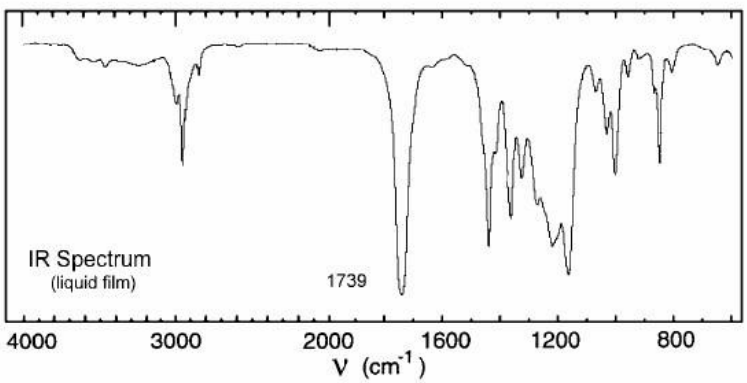
Q.3 Answer the following (any two) –

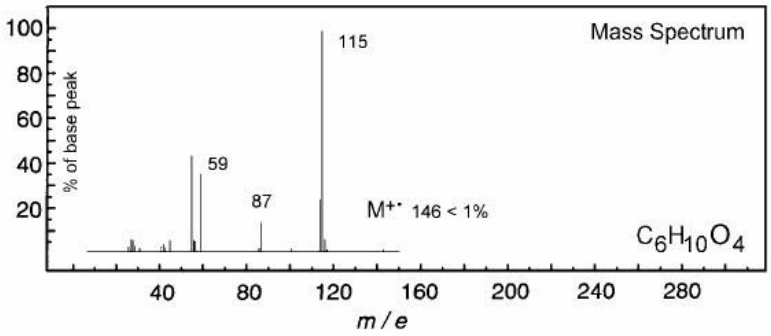
a) i) Discuss with example how bond length and mass of atoms affect IR spectrum. (*5 Marks*) 9 2 CO4

ii) With an example, explain how the C=O and C-O bond stretching

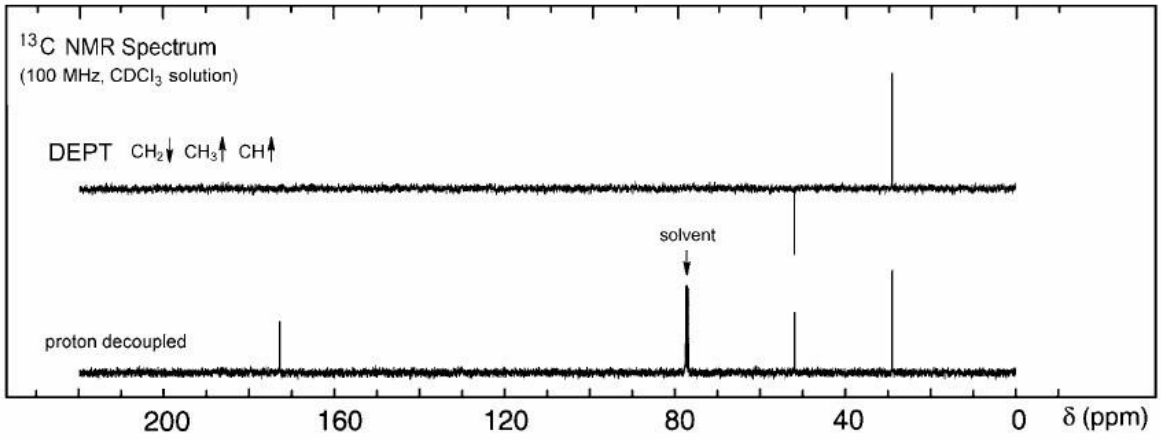
frequency get affected because of resonance in IR spectroscopy. (*4 Marks*)

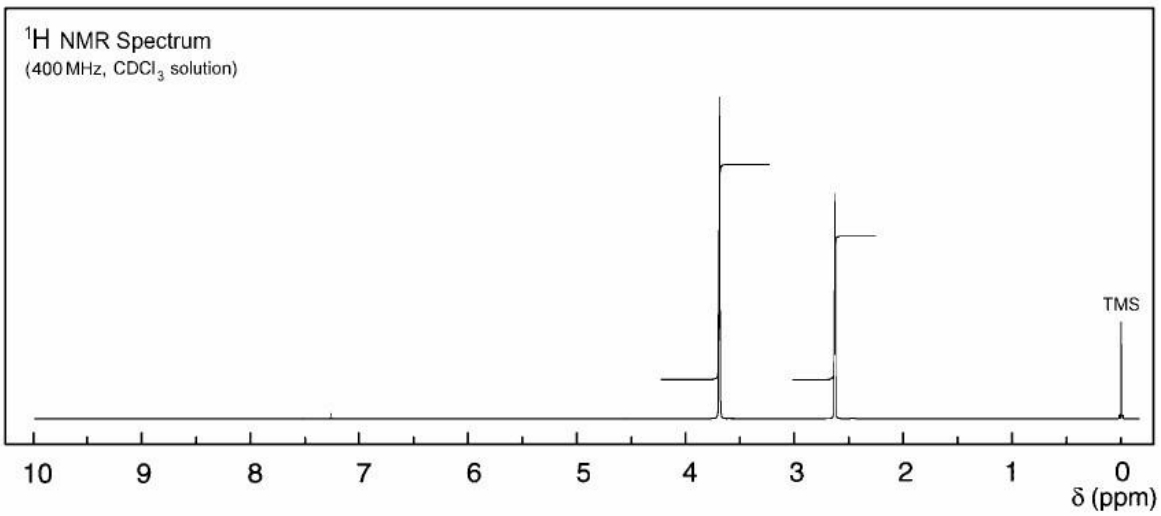
b)	i) How many signals do you expect in 1^H NMR spectrim of following compounds? Draw a rough sketch of the spectrum splitting pattern for each (*4 Marks*). a. CH_3OCHCl_2 b. CH_3CH_2OH ii) Explain with an example, how we get spectrum in ^1H NMR spectroscopy? (*5 Marks*)	9	3	CO3
c)	Identify structure of an organic compound that has following spectral data.	9	4	CO5





No significant UV absorption above 220 nm





*****