MSc DEGREE EXAMINATION MAY 2019
(Third Semester)

Branch - **CHEMISTRY**

MOLECULAR SPECTROSCOPY & APPLICATIONS

Time : Three Hours Maximum : 75 Marks

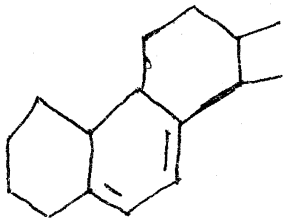
Answer **ALL** questions
ALL questions carry **EQUAL** marks (5 x 1 5 = 75)

1 a Explain the term “Chromophores". (3)

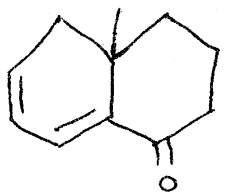
b Discuss the solvent effect on a, (3. Unsaturated carbonyl compounds, (6)

c Calculate the *X* max for the following compounds. (6)

i)



ii)



OR

d What are auxo chromes? (3)

e Write a short notes on “charge transfer spectra[5]'. (5)

f Explain the spectra of transition metal complexes. (7)

2 a Write the selection rule of IR spectra. (3)

b Sketch and the normal modes of vibration of CO_2 molecules. (5)

c Give a detailed account of “Finger Print region". (7)

OR

d What are the differences between stoke and anti stoke lines? (3)

e Write any five differences between IR and Raman spectra. (5)

f Discuss the instrumentation of Raman spectrometer. (7)

3 a Write any three factors influencing chemical shift. (3)

b Give a detailed account of geminal and vicinal coupling. (5)

c Gi ve a detailed account of double resonance spectra. (7)

OR

d Explain Nuclear - over hauser effect. (3)

e Discuss any one method to convert non first order spectra to first order spectra. (5)

f Outline any three applications of NMR spectra to organic compounds.(7)

4 a Define spin - spin interaction. (3)

b What are the factors influencing chemical shift and coupling constant. (5)

c Discuss the applications of NMR in structural determination of boranes and WF_6. (7)

OR

d What is 2D NMR spectra? (3)

e Describe the method to determine the activation energy of exchange reaction. (5)

f Explain the applications of NMR in structural determination of AsF_3 and $S0_3$. (7)

5 a What is g value? (3)

b Explain the various factorsaffectingmagnitude of 'g-value'. (5)

c Discuss the Hyper - five splittingwithan example. (7)

OR

d Explain Doppler effect. (3)

e Outline any two applications of MB spectroscopy to inorganic compounds. ' (5)

f Discuss the application of ESR spectra in the structural determination of $[CNH_3)_5$ - Co - O - $Co(NH_3)_5]^{5+}$ and [NO $(S0_3)_2$f. (7)

z-z-z

END