PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MSc DEGREE EXAMINATION DECEMBER 2018
(Third Semester)

Branch-CHEMISTRY

MOLECULAR SPECTROSCOPY & APPLICATIONS

Time : Three Hours **Maximum : 75 Marks**

Answer ALL questions
ALL questions carry EQUAL marks **(5x15 = 75)**

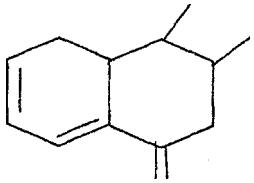
1 a Explain the term 'Transition Probability'. **(3)**

b Discuss the different types of electronic transition. **(5)**

c Explain the solvent effects in *n* -»*it* * and n -» *n* * transitions. **(7)**

OR

d Calculate the *A* max for the following molecules : **[6]**

i) **ii)**  **iii)** $0 = C - CH_3$

O

e Write a short notes on absorption and intensity shifts. **(5)**

f Discuss any four applications of UV - visible spectra to organic compounds. **(4)**

2 a Explain the various factors influencing vibrational frequency, **(5)**

b Define Fermi Resonance. **(3)**

c Discuss the number of fundamental vibrations of H_2O and $C0_2$ Molecules. **(7)**

OR

d Explain stoke and antistoke lines. **(3)**

e Bring out the differences between IR and Raman spectroscopy. **(5)**

3 a Define chemical shift. **(3)**

b What are the factors influencing chemical shift? **(5)**

c Give a detailed account of spin-spin interaction with an example. **(7)**

OR

d Explain Nuclear Overhauser effect. **(3)**

e Write short notes on chemical shift reagents. **(5)**

f Discuss the geminal and vicinal coupling with an example. **(7)**

4 a Explain the salient features of 'off-resonance decoupling'. **(5)**

b How will you determine the structure of complexes of WF_6 and structure of BOF_4? **(5)**

Write short notes on '2D NMR'. **(5)**

OR

4 Cont...

e Explain the basic principle of ^{13}C NMR spectra. (5)

f Discuss the applications of NMR spectra in the structural determination of ASF_3 and SO_3. (5)

5 a Discuss the basic principle of ESR spectra. (8)

b Explain zero field splitting and Kramer's degeneracy with an example. (7)

OR

c What is isomer shift? (3)

d Explain the quadrupole splitting with an example. (5)

e Discuss the applications of ESR spectra in structural determination of complexes $[Fe(CN)_5NO]^{3'}$ and $CuSiF_6.6H_20$. (7)

Z-Z-Z END