MANIPAL
ACADEMY of HIGHER EDUCATION
(Deemed to be University under Section 3 of the UGC Act, 1956)

Reg. No.										

DEPARTMENT OF SCIENCES, III SEMESTER M.Sc (CHEMISTRY)
END SEMESTER EXAMINATIONS, NOVEMBER 2018

SUBJECT - SPECTROSCOPY II [CHM - 5101]
(REVISED CREDIT SYSTEM-2017)

Time: 3 Hours | Date: 20th Nov 2018 | MAX. MARKS: 50

Note: (i) Answer **ALL** questions

(ii) Draw diagrams, and write equations wherever necessary

1A. Calculate the frequency of the electromagnetic radiation absorbed by the electron, when it is placed in 0.895 tesla magnetic field.
(Given that g = 2.002 and $\mu_B = 9.274 \times 10^{-24}$ JT^{-1}). If the frequency has to be 100 MHz, what should be the magnetic field?
1B. Predict the ESR spectrum of CH_2OH radical.
1C. With suitable example explain proton coupling and proton decoupling C13 NMR.
[3+3+4]

2A. Discuss ENDOR technique with selection rule, used in ESR.
2B. Explain quadrupole shift with suitable example
2C. Describe zero-quantum and double- quantum relaxation in C13 NMR
[3+3+4]

3A. Explain the principle of NQR spectroscopy.
3B. Explain the experimental technique used in Mossbauer spectroscopy
3C. Predict the C13 – DEPT spectra for 2-hexanol and 4-methyl-2-pentanol
[3+3+4]

4A. Explain the principle involved in the ionization technique of mass spectrometry used for the nonvolatile sample. What are its advantages and disadvantages?
4B. Illustrate the variation of vicinal coupling constant with dihedral angle between two vicinal C-H bonds.
4C. What are non-first order spectra? Discuss the methods used for the simplification of non-first order NMR spectra.
[3+3+4]

5A. Give reasons for the following;

i) The increase in dilution affects the resonance position of OH proton in NMR spectra of p-nitro phenol.

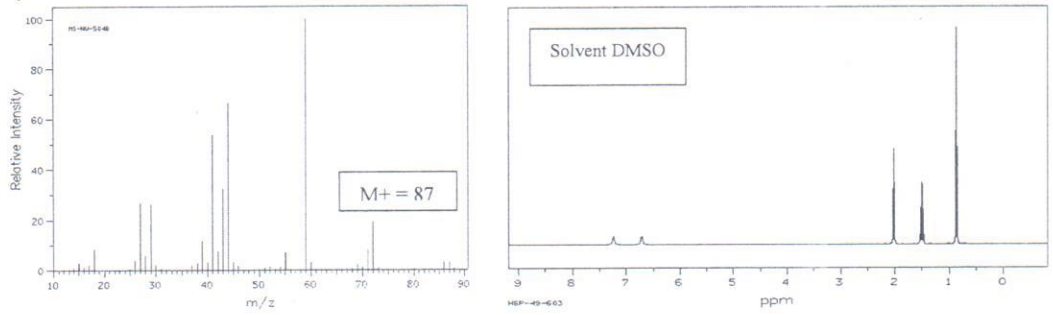
ii) Strong molecular ion peak is observed in case of aromatic hydrocarbons with no long side chains.

iii) TMS is used as standard in ^1H NMR spectroscopy

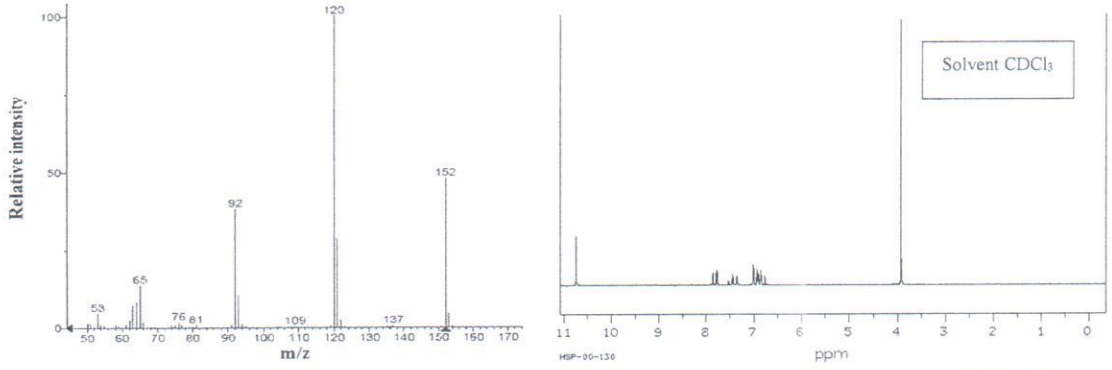
5B. What are soft ionization techniques? Discuss about any three of them.

5C. Deduce the structure of the two organic compounds using the NMR and mass spectra given below.

i)



ii)



[3+3+4]

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