TM153105C

Reg. No:……..

Name:……..

M. Sc. DEGREE (C.S.S) EXAMINATION, OCTOBER 2016
SEMESTER III - CHEMISTRY
CH3C12TM – MOLECULAR SPECTROSCOPY- II

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

PART A

I. Answer any five questions. Each question carries 3 marks

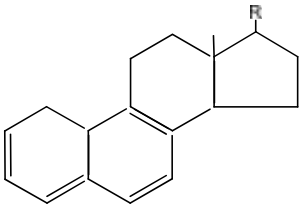
1. Explain about the energy levels in UV spectroscopy
2. What is FTIR? What are its advantages over ordinary IR spectrum?
3. Define first order and second order spectra
4. What is selective population in NMR?
5. What is meant by spin lattice relaxation?
6. Describe the basic principle of FAB
7. How will you distinguish propanone and propanol using different spectroscopic techniques? Explain

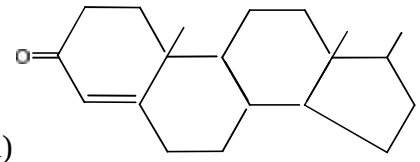
(5×3=15)

PART B

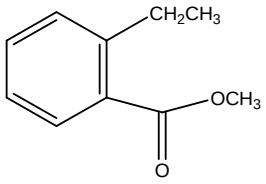
II. Answer any six questions. Each question carries 5 marks

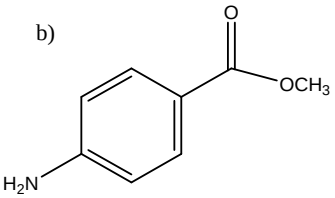
8. Calculate the value of absorption maximum for the compounds

i) 

ii) 

9. Explain how UV spectroscopy can be used to study solvent polarity of carbonyl compounds
10. Briefly explain functional group region and fingerprint region in IR spectroscopy
11. What is NOE? Explain its use in structural elucidation using a suitable example
12. What are shift reagents? What is its use in NMR spectra? Name two shift reagents
13. Explain the principle of 2D NMR. Explain homocosy and heterocosy
14. How will you distinguish between the following compounds by mass spectrometry? Explain

a) 

b) 

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15. Discuss briefly the ionization techniques MALDI and CI in mass spectrometry
16. Why is spectroscopy considered as an important tool for determining the structure of Compounds?

(6×5=30)

PART C

III. Answer any two questions. Each question carries 15 marks

17. a) Briefly explain the principle and working involved in UV and X-ray photoelectron spectroscopy
    b) Write short note on GCMS
18. Discuss the factors that affect C=C stretching frequency in olefins and C=O stretching frequency in carbonyl compounds
19. Discuss different methods to simplify non first order spectra to first order spectra.
20. Deduce the structure of an organic compound having molecular formula $C_{10}H_{14}O$

    ^{1}H NMR : δ 1.21 (d,6H), (J = 7Hz)
    δ 2.83 (septet, 1H, J = 7Hz)
    δ 3.72 (s, 3H)
    δ 6.74 (d,2H)(J= 9H)
    δ 7.18 (d,2H) (J= 9H)

    ^{13}C NMR ($CDCl_3$): δ 153, 141, 127, 115, 59, 33, 24

(2×15=30)