LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

**B.Sc.** DEGREE EXAMINATION – **CHEMISTRY**

FIFTH SEMESTER – NOVEMBER 2012

# CH 5508 - FUNDAMENTALS OF SPECTRASCOPY

Date : 08/11/2012 Dept. No. Max. : 100 Marks

Time : 9:00 - 12:00

**PART – A**

**Answer ALL questions: (10 x 2 = 20 marks)**

1. Define the term resolution.

2. The wavelength of a radiation is 2.5 x 10-6m. Calculate its frequency.

3. State Beer Lamberts’ law.

4. What are auxochromes? Give an example.

5. What are monochromators?

6. What is Rayleigh scattering?

7. Define coupling constant.

8. Define Larmour precessional frequency.

9. What is an isotopic peak?

10. What is FAB?

**PART – B**

**Answer any EIGHT questions: (8 x 5 = 40 marks)**

11. Explain the terms line width and intensity of spectral lines.

12. Discuss the types of transitions in molecules.

13. Discuss the instrumentation of photocolorimeter.

14. Explain the applications of Flame photometry.

15. Discuss the differences between IR and Raman Spectroscopy.

16. Explain the source and the sampling technique in IR spectroscopy.

17. Explain the following terms:

(i) Fundamental vibration (ii) Over tones

18. Explain the basic instrumentation of NMR spectroscopy.

19. Explain the pmr spectrum of CH3CHO and pure CH3CH2OH.

20. A compound having the molecular formula C10H14 gave the following pmr data:

(a) A singlet 9H (δ = 0.88)

(b) A singlet 5H (δ = 7.28) Give the structure of the compound.

21. Describe the importance of metastable peak in mass spectral analysis.

22. Explain the mass spectrum of Benzyl alcohol.

**PART – C**

**Answer ANY FOUR questions: (4 x 10 = 40 marks)**

23. a) Explain Frank-Condon principle. (6)

b) Benzene is colourless but its isomer, fulvene is yellow. Explain. (4)

24. Explain the principle, instrumentation and applications of atomic absorption spectroscopy. (2+4+4)

25. a) Discuss the theory of Raman Spectroscopy. (5)

b) Explain how IR spectroscopy can be used to differentiate inter and intra molecular hydrogen

bonding. (5)

26. a) Explain the types of stretching and bending vibrations of CO2. (6)

b) Discuss Fermi-resonance. (4)

27. a) Explain the term chemical shift. What are factors influencing it? (6)

b) Explain deuterium labelling in NMR. (4)

28. a) Illustrate Mclafferty rearrangement with a suitable example. (5)

b) Explain the instrumentation of mass spectrometer. (5)

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