LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

FIFTH SEMESTER – APRIL 2017

CH 5513 / CH 5508 - FUNDAMENTALS OF SPECTROSCOPY

Date: 26-04-2017 Dept. No. Max. : 100 Marks
Time: 01:00-04:00

PART – A

Answer ALL the questions. **(10x2=20)**

1. What is meant by electromagnetic radiation?
2. Define the term resolution.
3. What are chromophores? Give examples.
4. Explain the term progressions.
5. What are the types of stretching vibrations?
6. Write the principle of IR spectroscopy.
7. Explain deuterium labelling.
8. How can you distinguish CH_3CH_2OH and CH_3OCH_3 by ^1H NMR spectroscopy?
9. State nitrogen rule.
10. Give the significance of isotope peak.

PART – B

Answer any EIGHT questions. **(8x5=40)**

11. 2.5×10^{-2} M solution of a substance in 1 cm length cell at λ_{max} 255 nm has absorbance 1.12. Calculate ε_{max} for this transition.
12. Explain Boltzmann distribution.
13. State Beer-Lambert's law. Give its limitations.
14. Give the instrumentation of flame photometry.
15. Discuss the cell sampling techniques of IR spectroscopy.
16. Explain mutual exclusion principle.
17. Write the applications of Raman Spectroscopy.
18. Give NMR spectrum of n-butyl chloride.
19. Write the principle of NMR spectroscopy.
20. What is coupling constant? How is it useful?
21. Explain molecular-ion peak.
22. Discuss the detectors used in mass spectroscopy.

PART – C

Answer any FOUR questions. **(4x10=40)**

23. (a) Aniline absorbs at 280 nm (ε_{max}=8600), however, in acidic solution, the main absorption band is seen at 203 nm. Explain. **(5)**

    (b) Explain the types of electronic transitions. **(5)**

24. (a) Write the applications of AAS. **(5)**

    (b) Explain the factors governing absorption maxima and intensity of lines in UV spectroscopy. **(5)**

25. (a) Explain Finger print region.

    (b) Explain Rayleigh scattering. **(5+5)**

26. (a) Discuss the instrumentation of Raman spectroscopy.

    (b) How is intra molecular hydrogen bonding different from intermolecular hydrogen bonding? Explain using IR spectroscopy. **(5+5)**

27. Discuss the term chemical shift. Explain the factors that influence it.

28. (a) Explain base peak and metastable peak with a suitable example.

    (b) Write the mass spectrum of n-heptane. **(5+5)**

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