



Avinashilingam Institute for Home Science and Higher Education for Women  
Deemed to be University Estd. u/s 3 of UGC Act 1956, Category 'A' by MHRD (now MoE)  
Re-accredited with 'A++' Grade by NAAC. CGPA 3.65/4, Category I by UGC  
Coimbatore - 641 043, Tamil Nadu, India

**Continuous Internal Assessment –II April 2025**  
**VI Semester**

**Class : III UG**  
**Branch : Chemistry**

**Time : 2 hours**  
**Max. Marks : 60**

**21BCHC24 Analytical Chemistry**

Course Outcomes:

- CO1: Analyse the experimental data and present it systematically  
CO2: Identify and assess quantitatively using electro analytical, thermal techniques  
CO3: Describe the different theoretical aspects of UV-Vis, Rotational spectroscopy  
CO4: Describe and evaluate the application of Vibrational IR and Raman Techniques  
CO5: Describe and evaluate the application of NMR spectroscopy

**Part A**

**6 x 1 = 6**

**Choose the Correct Answer**

1. NMR spectra is based on the absorption of electromagnetic radiation in the  
a. Microwave region    b. radio frequency region    c. IR region    d. UV region    CO5K1
2. Pick out the reference standard for NMR spectra.    CO5K1  
a. TMS    b. CHCl<sub>3</sub>    c. DME    d. DMSO
3. The distance between the centers of the peaks of doublet is called as?    CO5K1  
a. Coupling constant    b. Spin constant    c. Spin-spin coupling    d. Chemical shift
4. In which spectroscopic techniques the change in vibrational and rotational movements can be detected?    CO4K1  
a. UV    b. IR    c. NMR    d. MS
5. Which of the following molecules may show absorption in IR spectroscopy?    CO4K3  
a. HCl    b. O<sub>2</sub>    c. H<sub>2</sub>    d. Cl<sub>2</sub>
6. Over tones are mainly observed in    CO4K3  
a. near IR    b. mid IR    c. far IR    d. UV

**Part B    3 x 6 = 18**

**Answer ALL questions**

**Each answer should not exceed 400 words or two pages**

7. a. Discuss in detail about Frank Condon Principle    CO3K2  
(or)
7. b. Derive Lambert beer law    CO3K2
8. a. Explain in detail about interpretation of hydrogen bonding using IR spectra    CO4K2  
(or)
8. b. Differentiate between IR and Raman spectroscopy    CO4K3
9. a. Define chemical shift. Illustrate with example.    CO5K3  
(or)
9. b. Explain shielding and de-shielding effects in NMR.    CO5K3

**Part C**

**3 x 12 = 36**

**Answer ALL questions**

**Each answer should not exceed 800 words or four pages**

10. a. i) Enumerate on rule of Mutual Exclusion    CO3K3  
ii) Discuss in detail about fundamental components of Raman spectrophotometer    CO3K2  
(or)
10. b. What is Raman effect? Explain classical theory of Raman scattering
11. a. i) Explain the IR spectrum of acetone, benzyl alcohol and ethyl acetate.    CO4K4  
ii) Discuss in detail about the vibrational modes noticed in IR spectroscopy    CO4K4  
(or)
11. b. Explain in detail instrumentation of IR spectroscopy    CO4K3
12. a. Interpret NMR spectrum of Ethanol, acetone and benzaldehyde.    CO5K3  
(or)
12. b. Describe the theory of NMR spectroscopy? Write short notes on Shielding and deshielding effects in NMR    CO5K3

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**Staff In-charge: Dr. A. Prithiba**