

M.Sc.(Chem.) Semester - 4 (CBCS) Examination

Oct/Nov -2020 [OLD COURSE]

ADVANCE SPECTROSCOPIC TECHNIQUES (CORE)

Time: 2:00 Hours

Marks: 56

Instructions:

1. Figures to the right indicate marks.
 2. There are five questions in the question paper.
 3. Answer any four of the following questions.
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Q1. Answer any seven of following ten questions

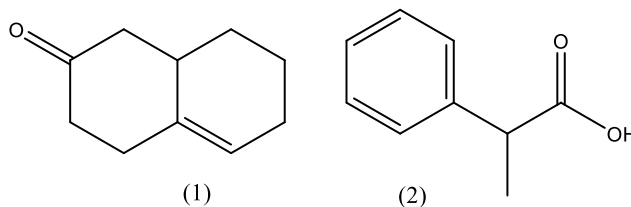
(14)

1. Identify types of proton in (i) trans Cinnamic acid (ii) o-Xylene
2. Why TMS is used as a reference standard in NMR spectroscopy?
3. Name the IR regions with associate wavelengths.
4. Calculate fundamental mode of vibrations for CO₂ and BF₃.
5. Write selection rule for IR spectroscopy with equation.
6. Draw schematic diagram of photomultiplier tube.
7. Why far UV region is known as vacuum UV region?
8. Explain metastable ion peak in Mass Spectrometry.
9. Give brief account of ESR spectroscopy.
10. Write principle of Raman Spectroscopy.

Q2. Answer any two of the following three questions.

(14)

1. Discuss ESR spectrum of K₃Fe(CN)₆.
2. Explain different types of absorption and intensity shift observed in UV spectroscopy.
3. Calculate the wavelength ($\lambda_{\max}$) for following compounds:



Q3. Answer the following questions

(14)

1. Explain various ionization techniques of Mass spectrometry with suitable example.
2. Draw representative bar graph for octane and Iso octane and discuss that how will you distinguish between octane and Iso octane?

Or

Q3. Answer the following questions

(14)

1. Explain with suitable example: (i) Fermi resonance (ii) Overtone
2. Discuss bending vibrations in IR spectroscopy.

Q4. Answer any two of the following three questions.

(14)

1. Discuss Shielding and Deshielding effect in PMR spectroscopy.
2. Explain various region of chemical shifts for ¹³C NMR Spectrum.
3. Give brief account of Raman Spectroscopy and discuss the difference between Raman and Infrared spectra

Q5. Answer any two of the following four questions.

(14)

1. How will you distinguish between o, m and p Cresol using PMR spectroscopy?
2. Discuss instrumentation of IR spectroscopy with schematic diagram.
3. Give the Principle of UV-Viz spectroscopy and discuss its applications.
4. Explain Homolytic and Heterolytic cleavage in Mass spectrometry.
