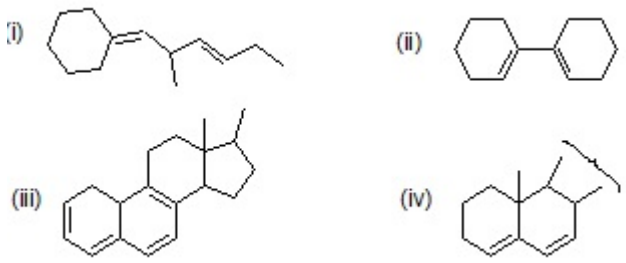
SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN (AUTONOMOUS)
(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)
Chromepet, Chennai — 600 044.
M.Sc. END SEMESTER EXAMINATIONS NOVEMBER-2022
SEMESTER - III
20PCHCT3007 - Organic Chemistry III

Total Duration : 2 Hrs 30 Mins. **Total Marks : 60**

Section A

Answer any **SIX** questions $(6 \times 5 = 30$ Marks)

1. Calculate the approximate frequency of C-H stretching vibration from the following data:
   k=5x10^5 g s^{-2}, mass of C atom = 20 x 10^{-24} g s^{-2}, mass of H atom = 1.6 x 10^{-24} g
2. Compare and contrast Raman and FT-IR spectroscopy.
3. Apply Woodward Fieser rules and calculate the absorption for the following compounds.



4. NMR spectrum is simplified by spin-spin decoupling and nuclear over Hauser effect- Explain.
5. Illustrate with proper justification the expected chemical shifts for different carbons with the help of ^{13}C NMR.
6. Discuss in detail about ^{13}C NMR relaxation mechanisms.
7. Mass spectrum of a volatile organic liquid with fruity smell shows peaks at m/z 77, 105 and 136. Identify the fragments and propose the structure of the compound.
8. Examine Mc-Lafferty rearrangement by giving suitable examples.

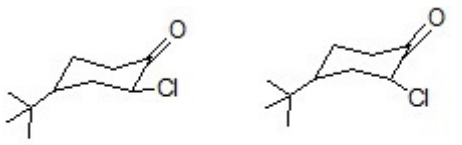
Contd...

Section B

Part A

Answer any **TWO** questions $(2 \times 10 = 20$ Marks)

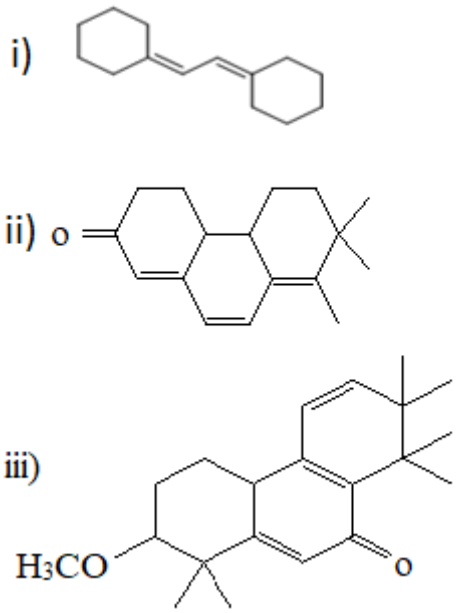
9. Interpret the following
   i) IR stretching frequencies of C=O bonds are different for the following compounds.



17454 cm^{-1} 1725 cm^{-1}

   ii) α- halogenated benzoic acids show two carbonyl stretching frequencies.

10. Predict λ_{max} for the following compounds using Woodward Fieser rule.



11. Infer the factors affecting chemical shift in ^{13}C NMR spectroscopy.
12. Examine the general mode of fragmentation of esters.

Part B

Compulsory question $(1 \times 10 = 10$ Marks)

13. A compound with molecular weight 116 gave the following spectral information:
    (i) UV: 283 mμ ϵ_{max}22.
    (ii) IR : 3000-2500 (b), 1715 (s), 1342 cm^{-1} (w).
    (iii) NMR : 7.88 τ Singlet (3H), 7.40 τ Triplet (2H), 7.75 τ Triplet (2H) and –1.1τ singlet (1H).
    Determine the structural formula of the compound.

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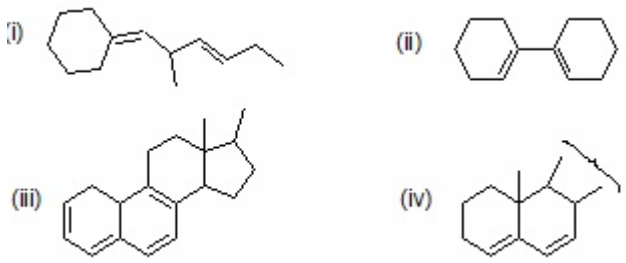

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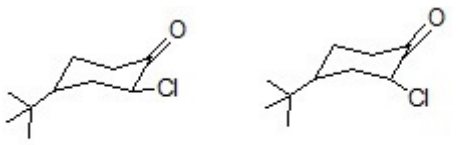

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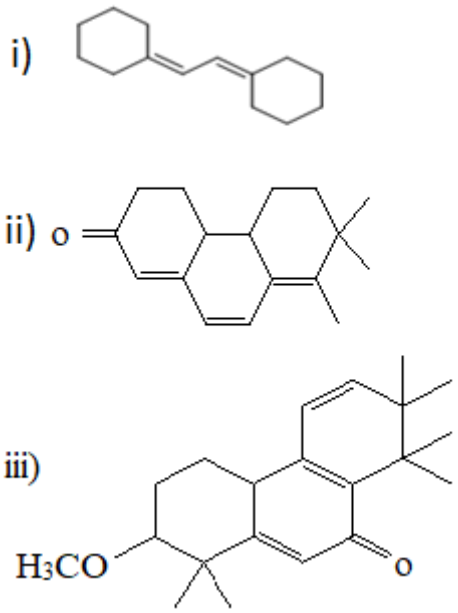

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