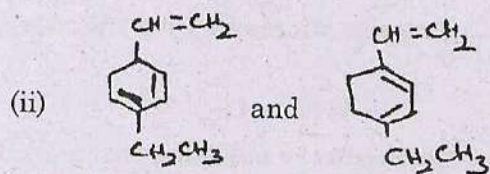
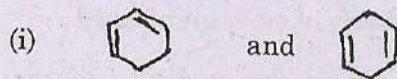


- (b) Predict and explain how UV Spectroscopy can be used to distinguish:



7. (a) Write in detail about the factors affecting the chemical shifts in ^1H NMR.
 (b) Discuss the first order and non-first order splitting involved in ^1H NMR Spectra.
8. An organic molecule with molecular formula $\text{C}_{10}\text{H}_{12}\text{O}$ shows the following spectral data.
 UV: $\lambda_{\text{max}} = 220\text{nm}$ and $\epsilon_{\text{max}} = 1800$.
 IR: 3077, 2976, 1745, 1608, 1497 and 1456 cm^{-1}
 ^1H NMR: 7.3 δ (5H, M); 4.3 δ (2H, t); 2.93 δ (2H, t) and 2.02 δ (3H, s). Deduce the structure of the compound.
9. Establish the structure of the Camphor and give its synthesis.
10. Explain the following:
 (a) Short and long-lived free radicals
 (b) Deduction of free radicals by ESR and
 (c) Phenol coupling reaction and its mechanism.

NOVEMBER/DECEMBER 2019

MCH31 — ORGANIC CHEMISTRY — III

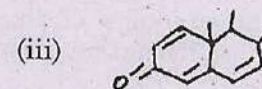
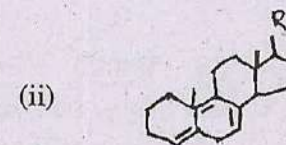
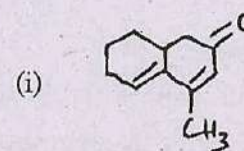
Time : Three hours

Maximum : 75 marks

SECTION A — (5 × 6 = 30 marks)

Answer ALL questions.

1. (a) Applying Wood-word and Fieser rule calculate the λ_{max} value of the following compounds:



Or

- (b) Describe the factors influencing vibrational frequencies in the IR Spectra.



2. (a) Suggest the three geometrical isomers of molecular formula C_2H_2BrCl as exhibits different 1H NMR Spectra and explain the concept involved.

Or

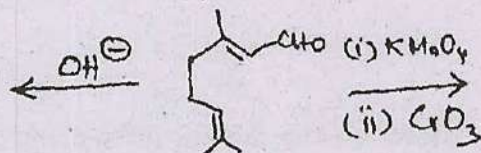
- (b) An organic compound with molecular formula $C_{11}H_{14}O$ shows the following spectral details:
 1H NMR δ : 7.3(5H,M); 4.30(2H,t); 4.15(2H,q); 2.93(2H,t) and 2.01(3H,t). Deduce the structure of the compound and explain.

3. (a) Describe haloketone rule and its relationship to cotton effect.

Or

- (b) Explain the following:
 (i) Nitrogen rule and its significance
 (ii) Retro-Diels Alder fragmentation.

4. (a) (i) Suggest the products of the following chemical transformation of Citral.



- (ii) Establish the synthesis of Citral.

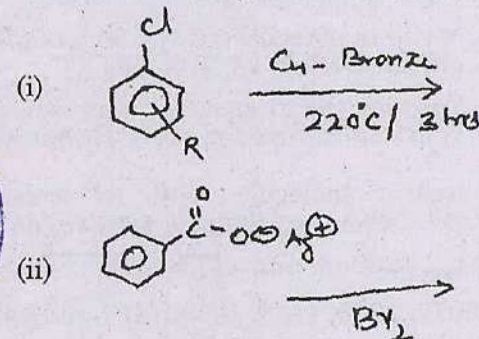
Or

- (b) How the oxidation reactions are used in the structural elucidation of α -pinens? Give the synthesis of cis-norpinic acid.

5. (a) Explain the free radical addition reaction to define double bonds using hydrobromination. Give the stereochemistry of it.

Or

- (b) Complete the following reactions. Identify the reaction and give its mechanism.



SECTION B — (3 × 15 = 45 marks)

Answer any THREE questions.

6. (a) How will you distinguish between the following pair by IR Spectroscopy?
 (i) Fermi resonance and Overtones
 (ii) Inter and intramolecular hydrogen bonding.