

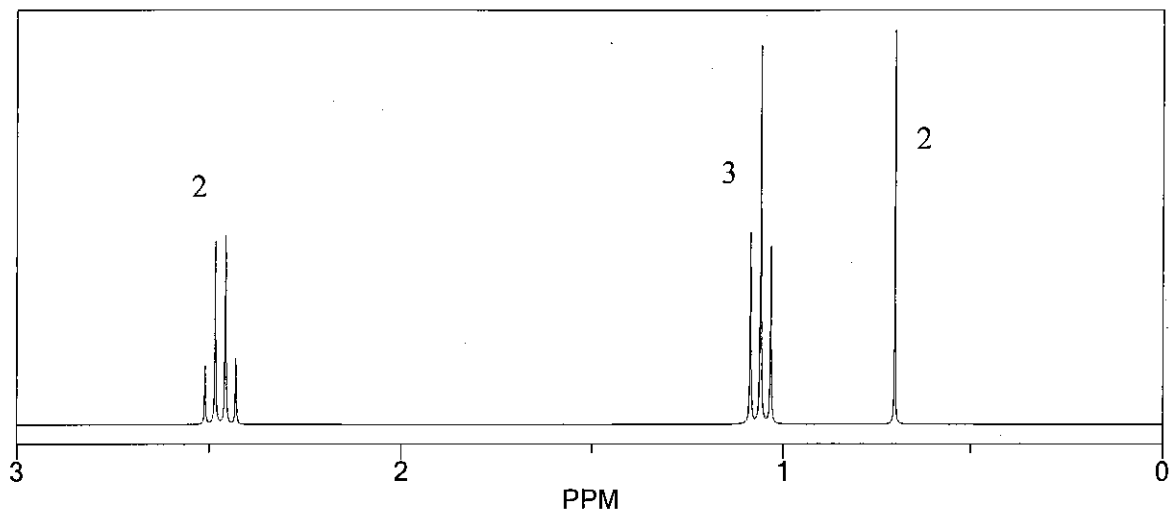
Unknown 1

Elemental analysis C, 70.10; H, 9.15

Mass spec: $M^+ = 154$

IR: 2950 cm^{-1} (strong); 1714 cm^{-1} (strong)

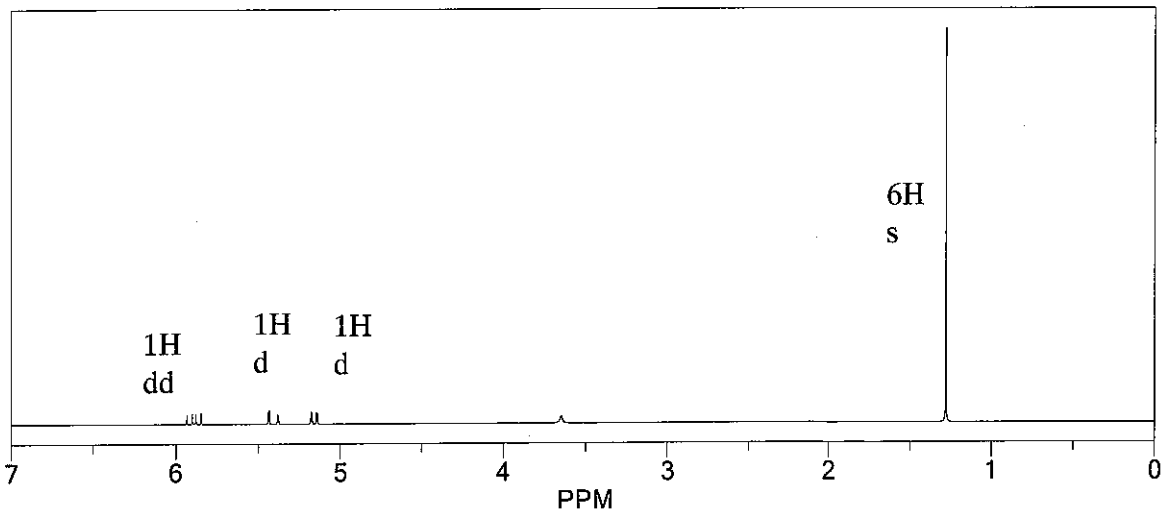
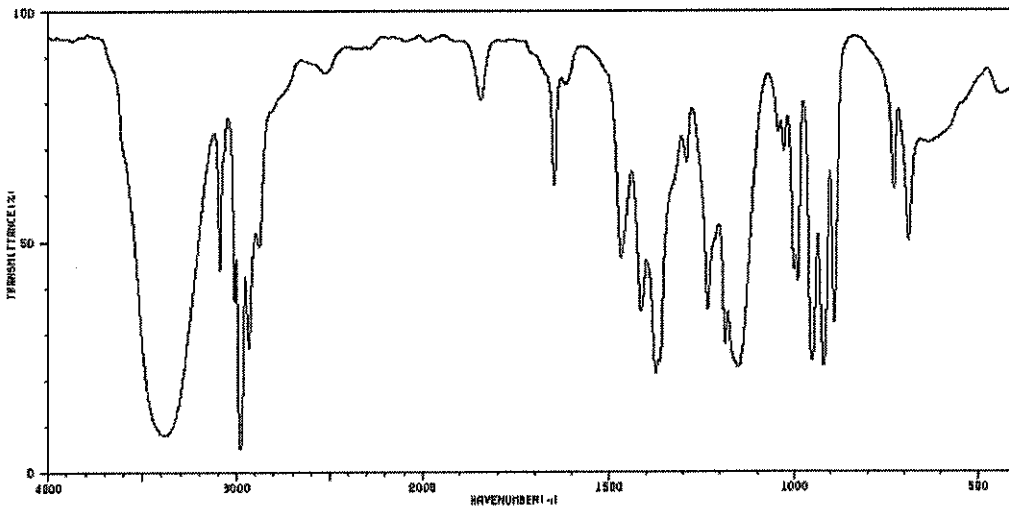
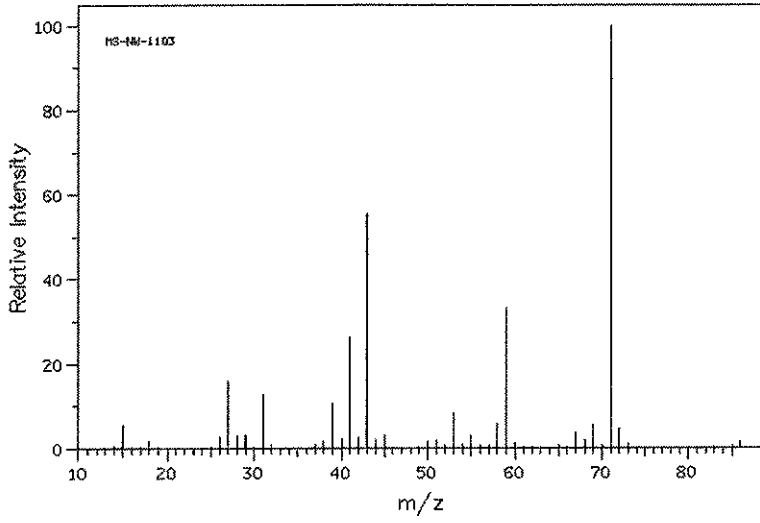
Proton NMR



^{13}C NMR

C-13 NMR	DEPT 90	DEPT 135
8 ppm	0	+
17 ppm	0	-
31 ppm	0	-
45 ppm	0	0
211 ppm	0	0

Unknown 2

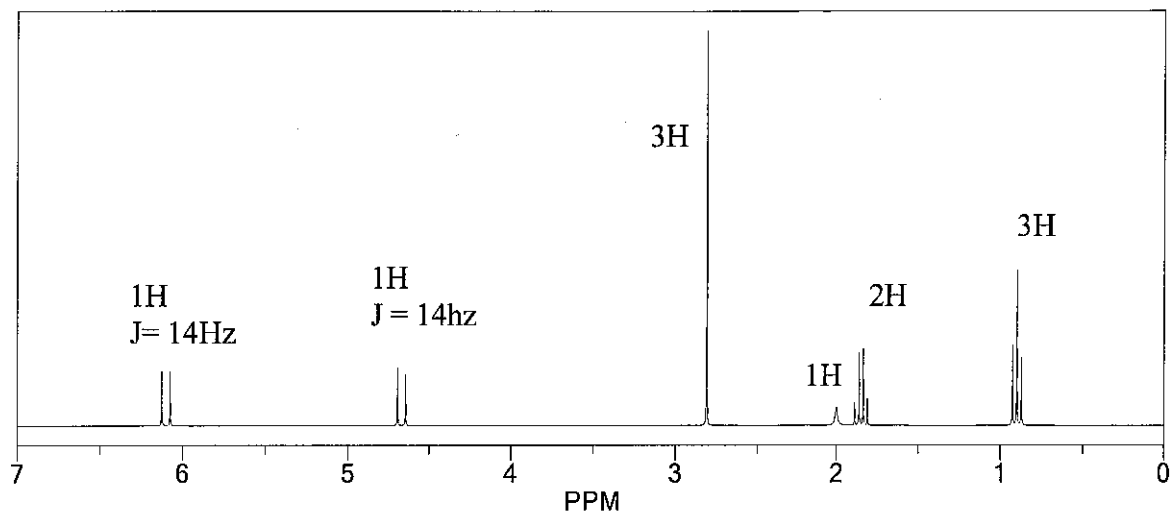


Unknown 3

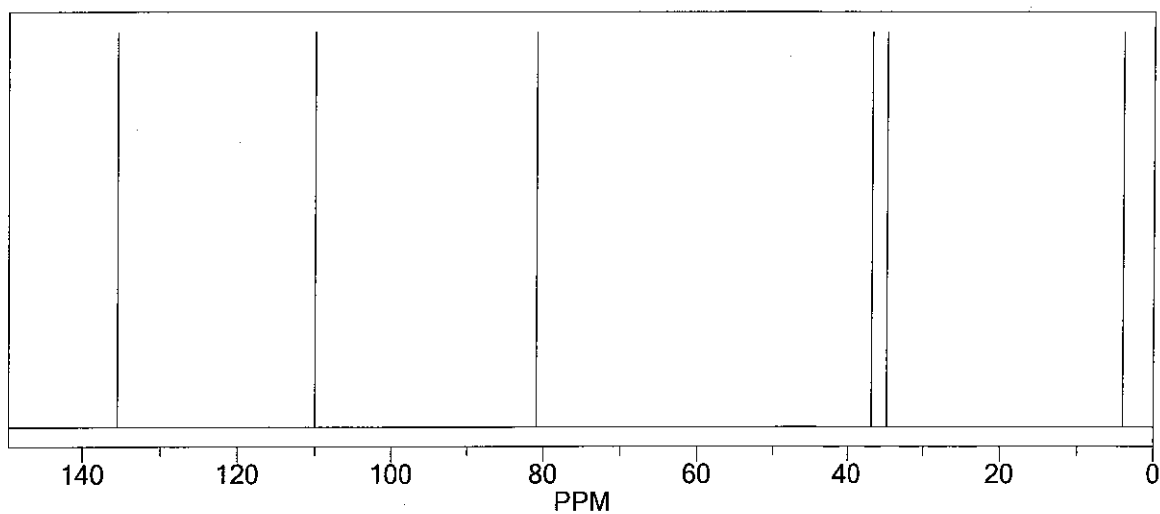
Mass spec: M^+ = 167 (100%); 169 (64%); 171 (10%)

IR: 3300 cm^{-1} (weak, broad), 3025 (m); 2975 (s), 1655 (sharp)

Proton NMR:

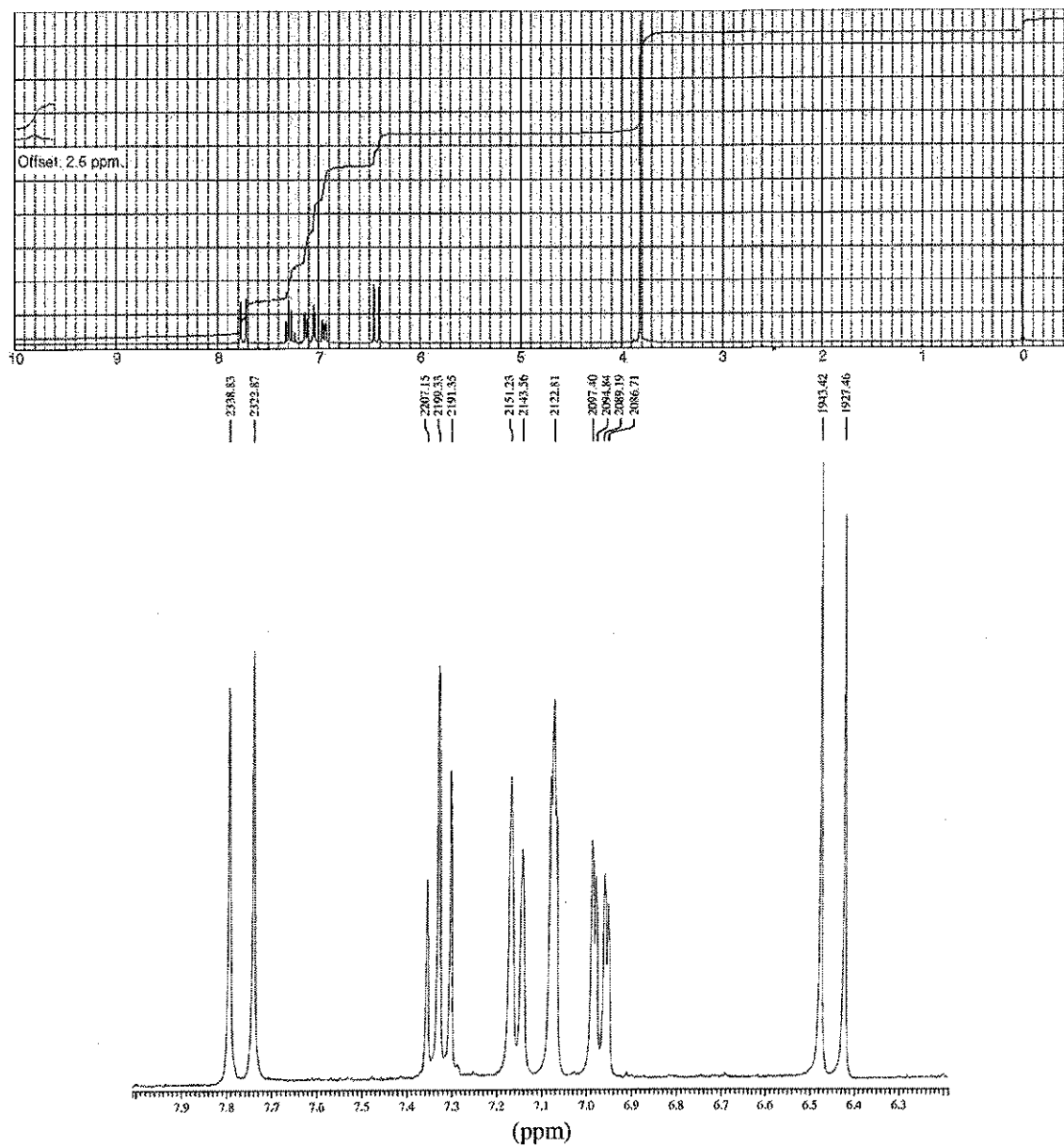


C-13 NMR



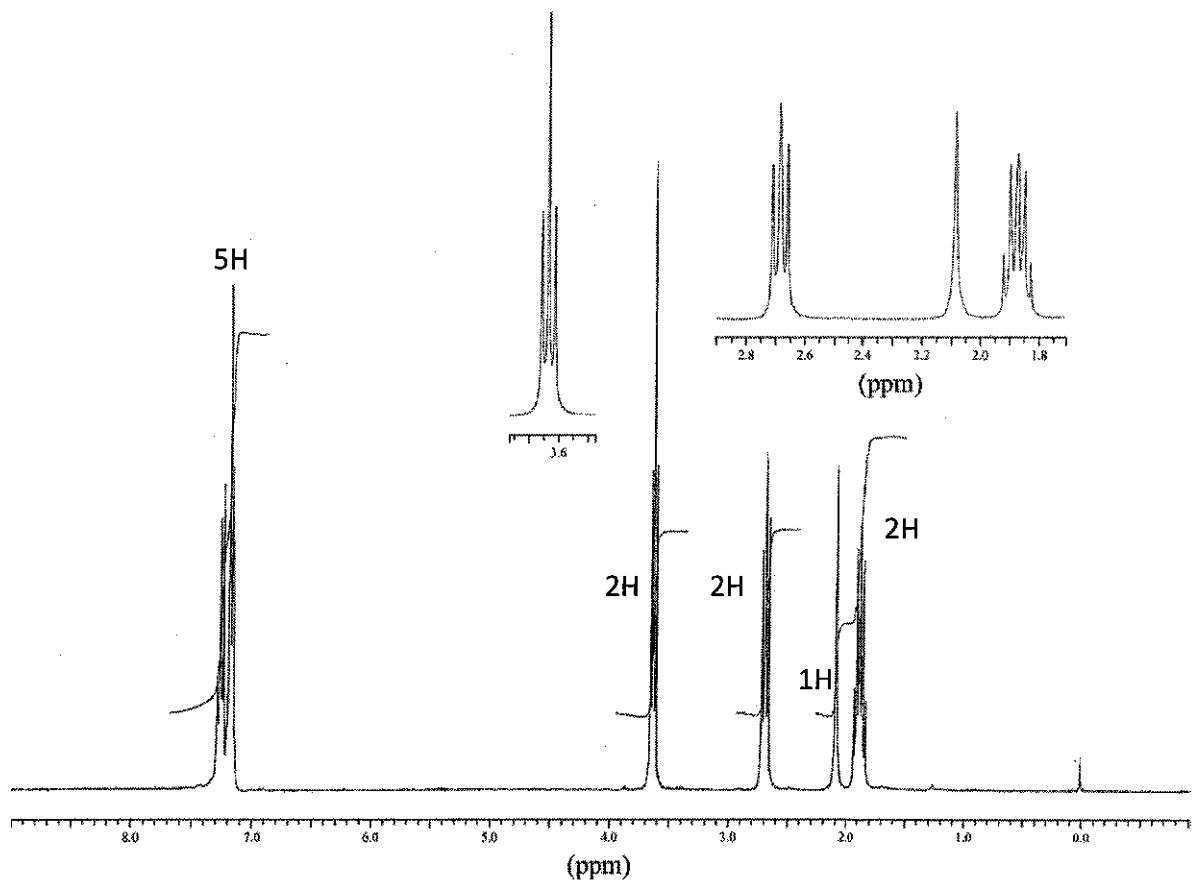
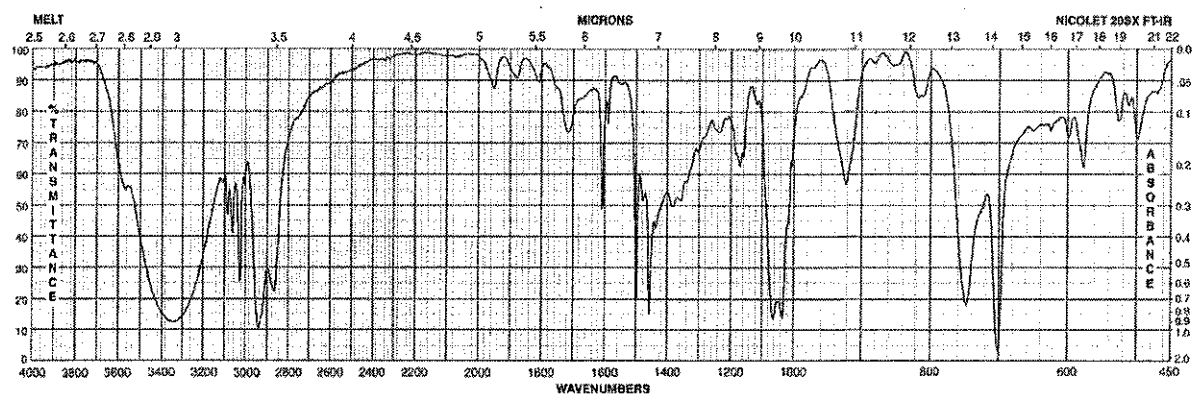
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A proton NMR spectrum is given below for a compound with the molecular formula $C_{10}H_{10}O_3$. Identify the structure of the unknown molecule. Determine the J -values and draw tree diagrams for each of the multiplets shown in the expansions.



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IR, ¹³C, and ¹H NMR spectra are given below for a compound with the molecular formula C₉H₁₂O. Identify the structure of the unknown molecule and assign peaks on the ¹H NMR.

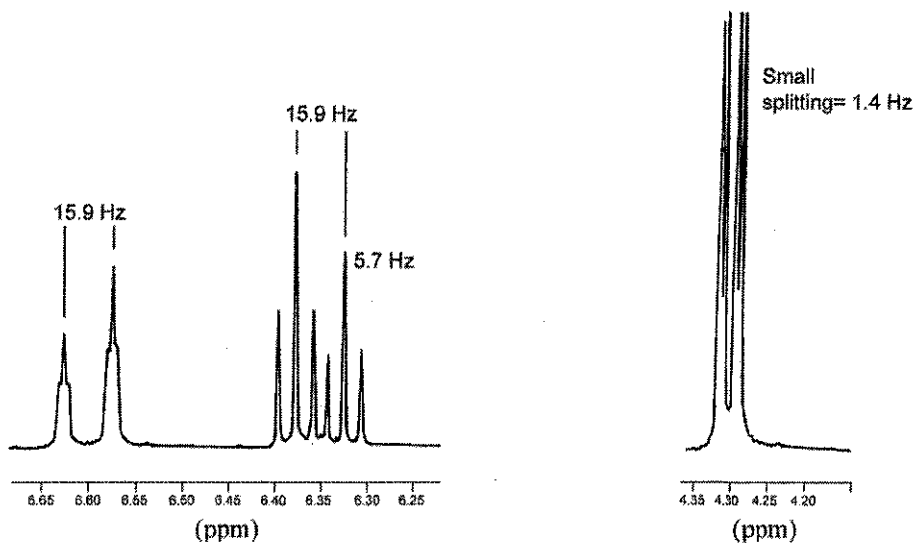
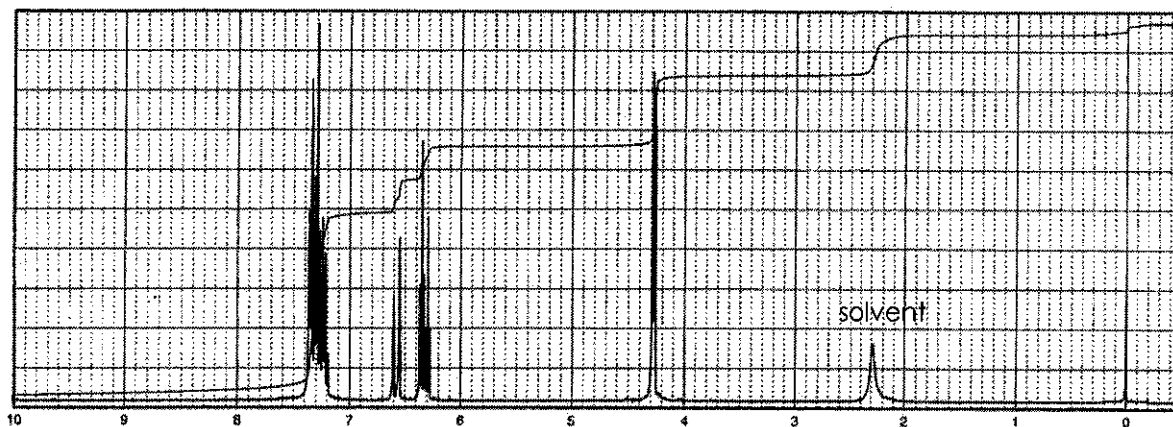
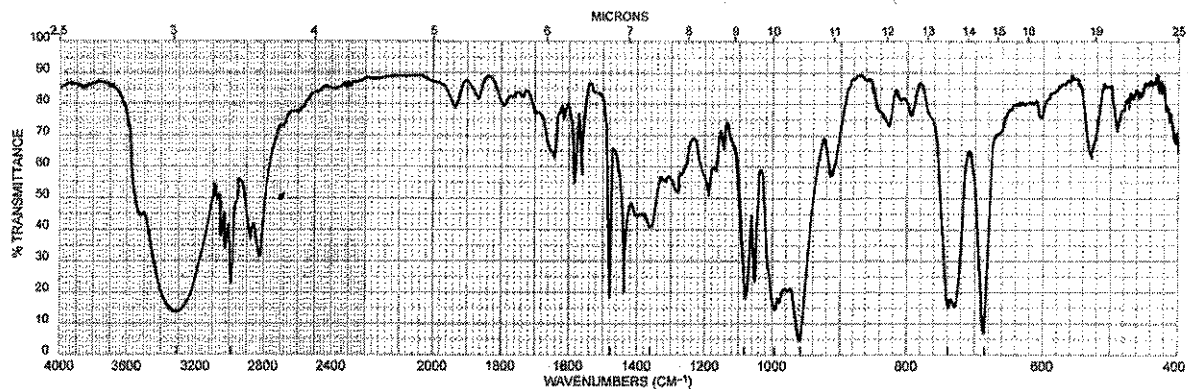


¹³C NMR: δ 139, 125, 124, 122, 57, 31, 28.

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Molecular formula: $C_9H_{10}O$

Note: acidic protons are not visible.



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Molecular formula: C_3H_4O

Note: acidic protons are not visible.

