

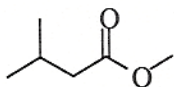
Jasperse
Chem 360
Test 2
Version 3

1. Predict the:

- ^1H NMR spectrum [include approximate chemical shifts (1's, 2's, 3's, 4's, 5's, etc.), integration, and splitting]
- ^{13}C NMR spectrum [include approximate chemical shifts (0-50, 50-100, 100-150, or 150-220) and splitting]
- identify any distinctive signals in the IR spectrum

Example: $\text{CH}_3\text{CH}_2\text{OCH}_3$	^1H NMR			^{13}C NMR	IR
		1's	3H	t	0-50, q
	3's	2H	q	50-100, t	
	3's	3H	s	50-100, q	

^1H NMR	^{13}C NMR	IR
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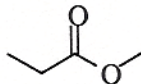


2. For the following molecule,

- Write how many "types" of H's there would be in the ^1H NMR spectrum (these are H's which might coincidentally overlap, but can't be assumed to be chemical shift equivalent)
- Write how many different ^{13}C NMR absorptions you would expect, and
- Write what the ^{13}C NMR splitting would be, i.e. singlet, doublet, triplet, or quartet for the ^{13}C NMR absorptions.

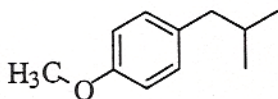
Number of Nonequivalent H's in H-NMR	Number of ^{13}C Absorptions in ^{13}C NMR	Expected Splittings in ^{13}C NMR
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Example:

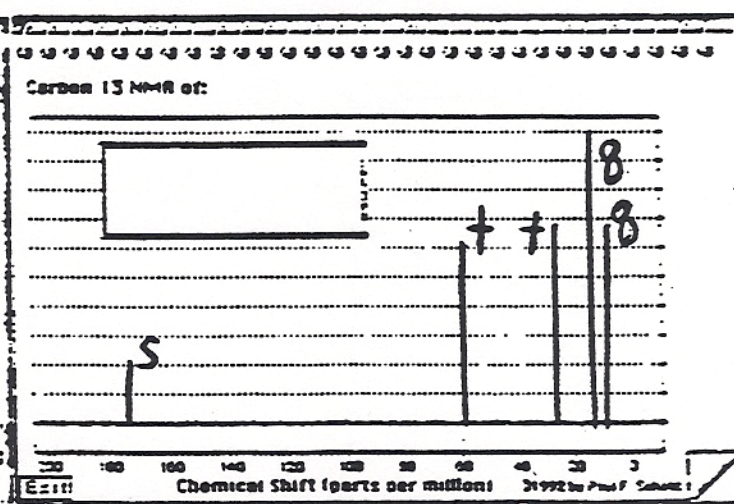
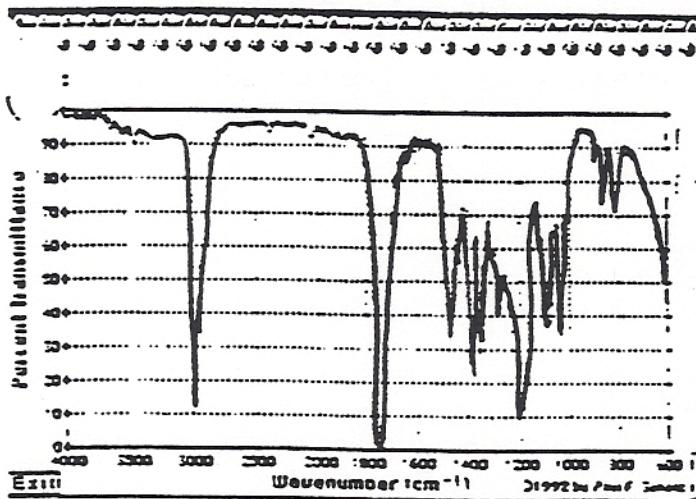
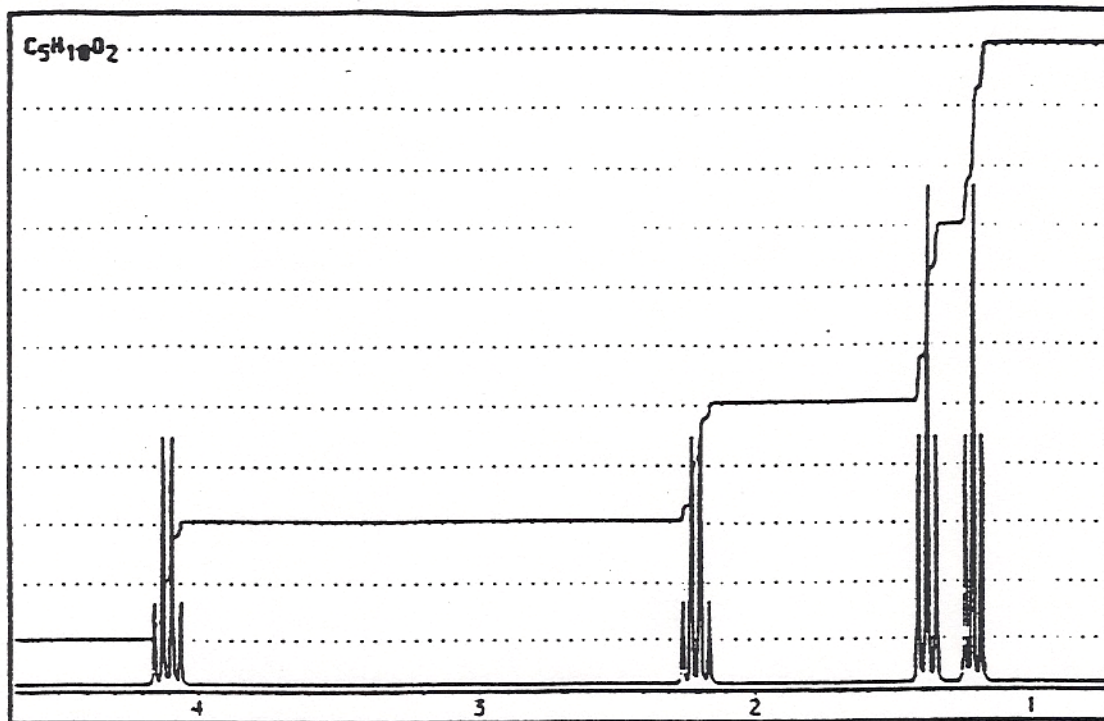


3	4	q, t, s, q
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Number of Nonequivalent H's in H-NMR	Number of ^{13}C Absorptions in ^{13}C NMR	Expected Splittings in ^{13}C NMR
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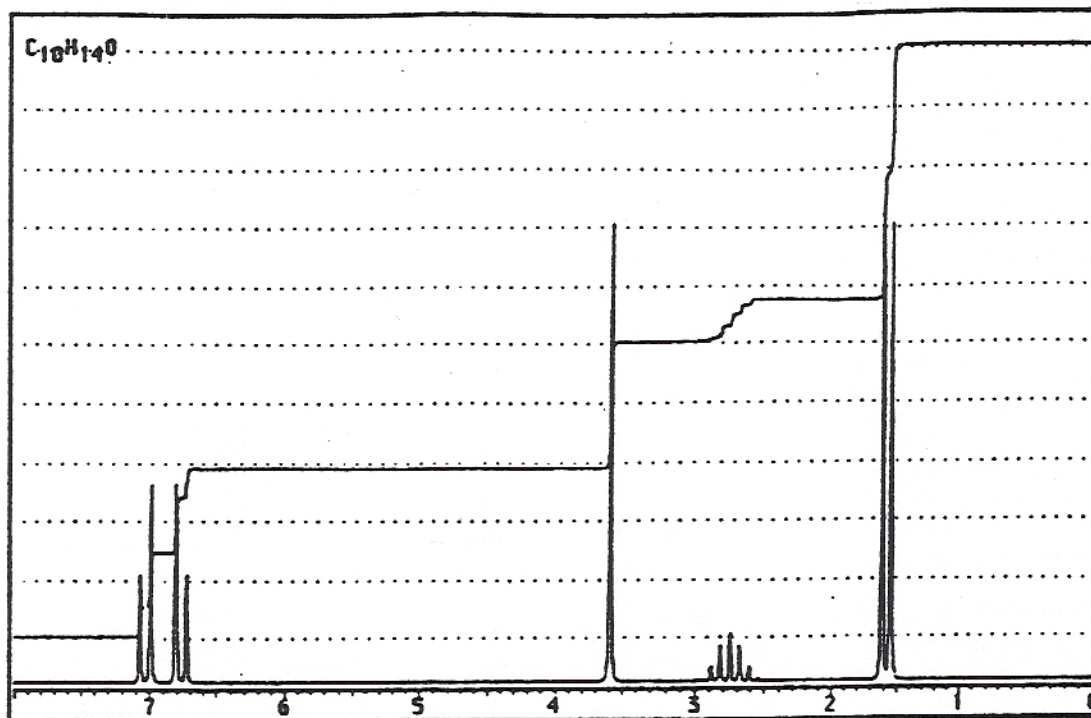
Provide Structures Based on the Following Spectroscopic Data (8 points each)
 4. $C_5H_{10}O_2$



5. C₁₀H₁₄O

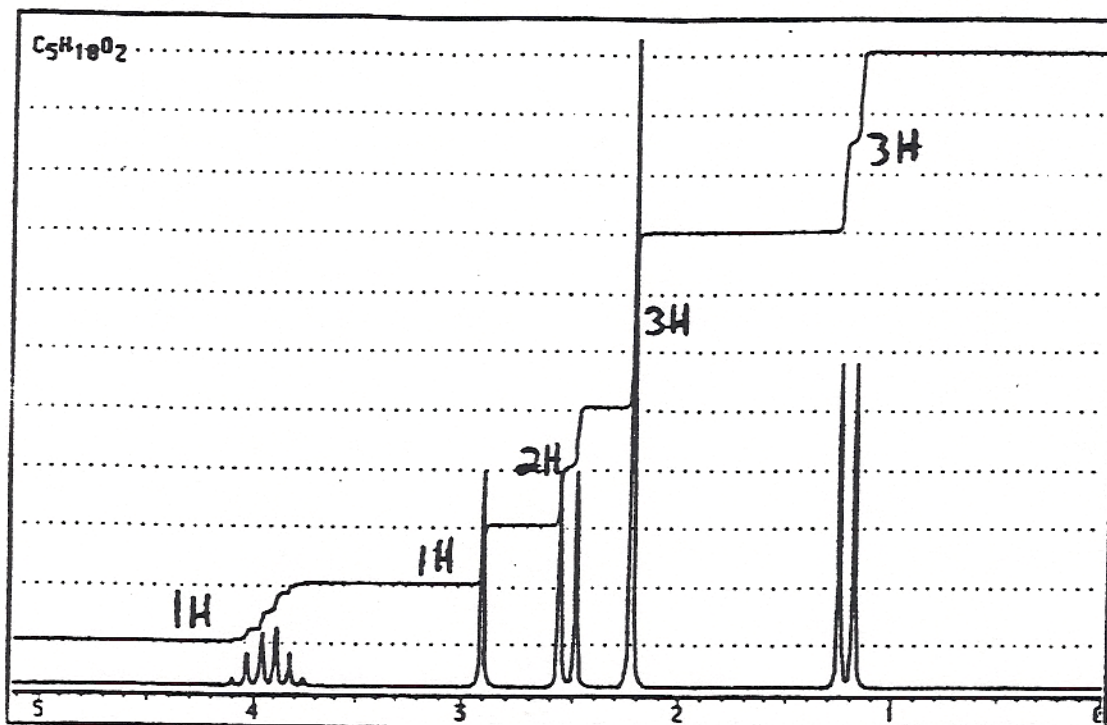
¹³C NMR:

148	s	135	d	75	q	50	d
122	s	128	d			22	q



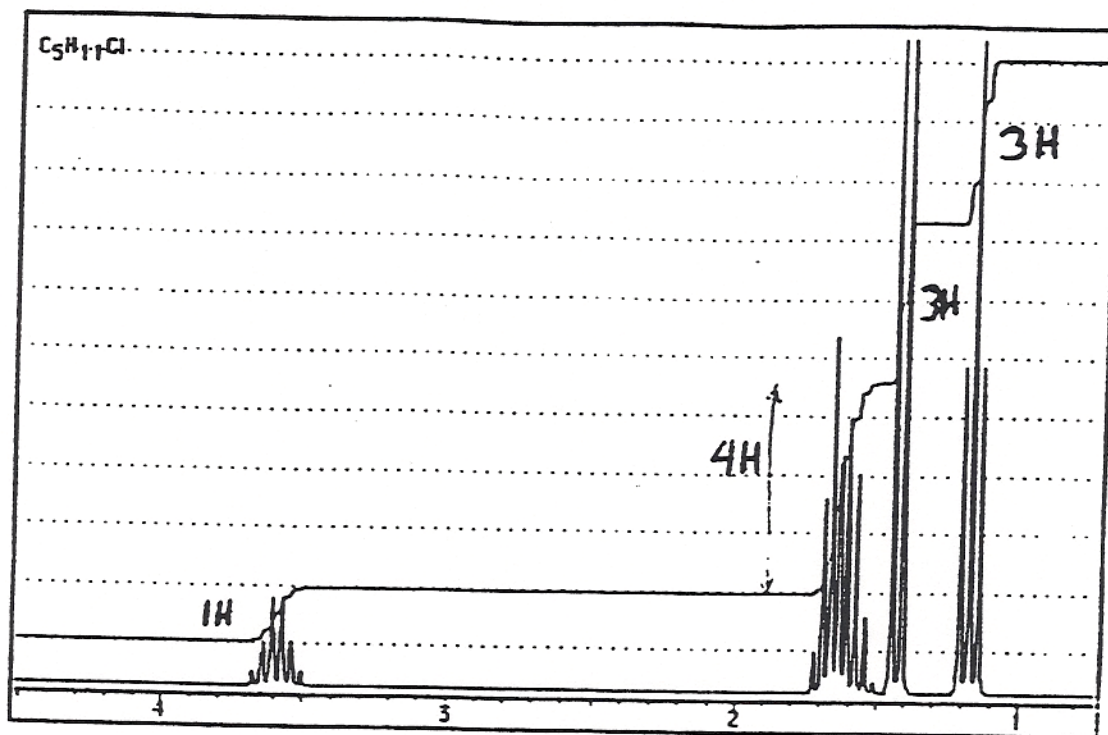
6. $C_5H_{10}O_2$

IR: 1710 (strong), 3300-3500 (broad, strong)

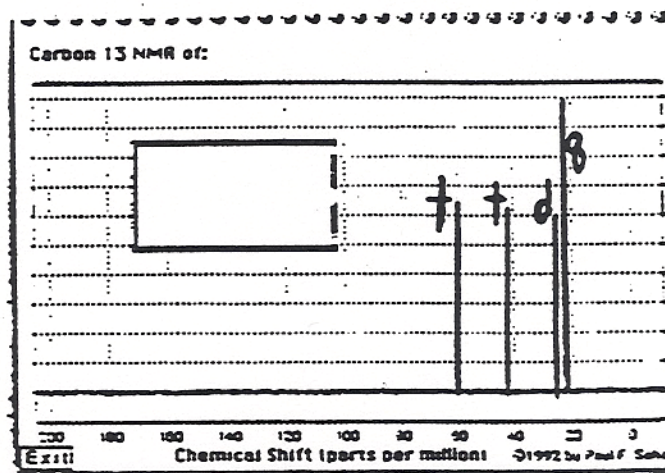
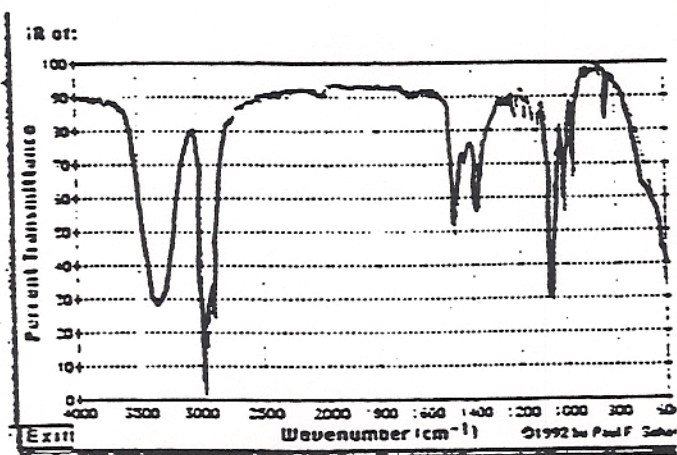
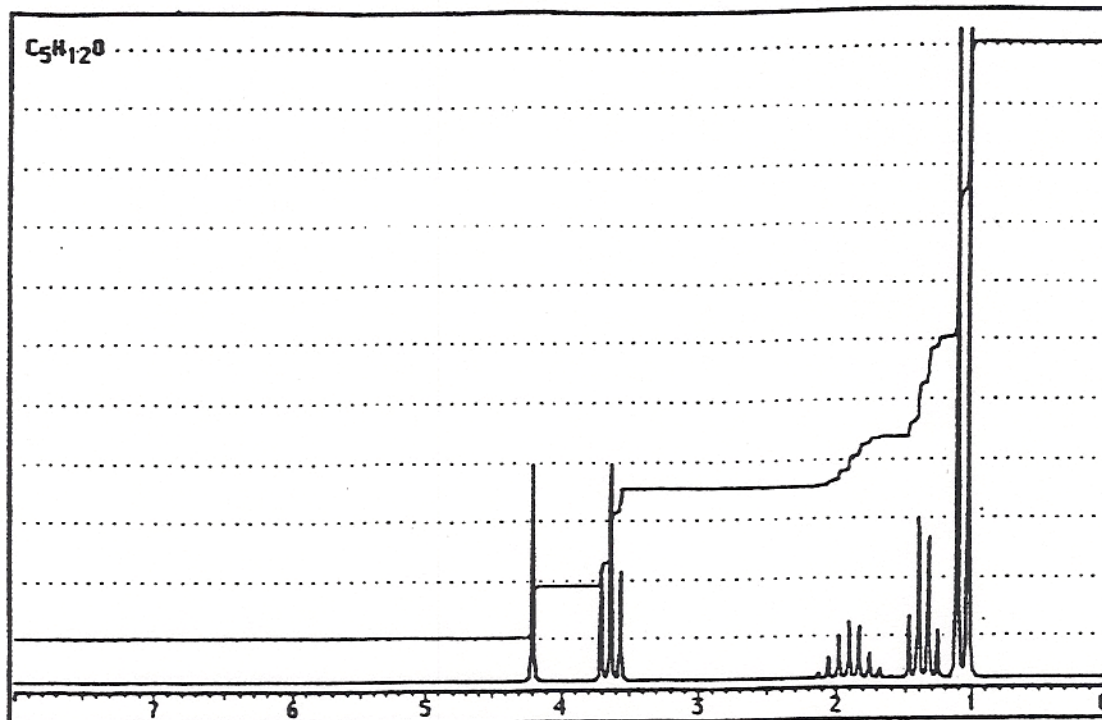


7. $C_5H_{11}Cl$

^{13}C NMR: 60 (d), 40 (t), 37 (t), 33 (q), 20 (q)



8. $C_5H_{12}O$



9. $C_4H_8O_2$
triplet, 1.02, 3H
sextet, 1.43, 2H
triplet, 2.35, 2H
singlet, 10.95, 1H

IR 1715 cm^{-1} and broad 2500-3000