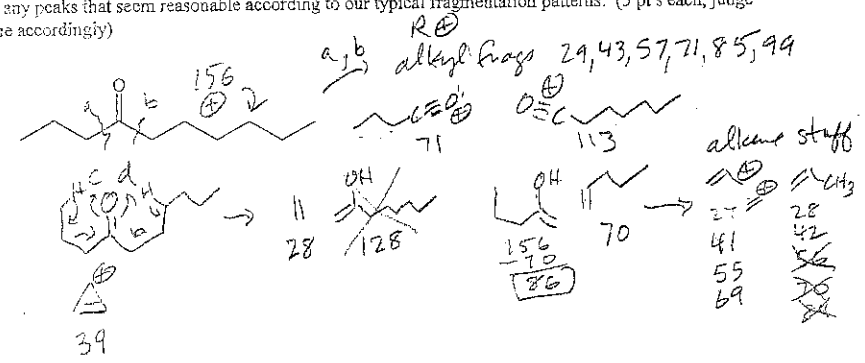
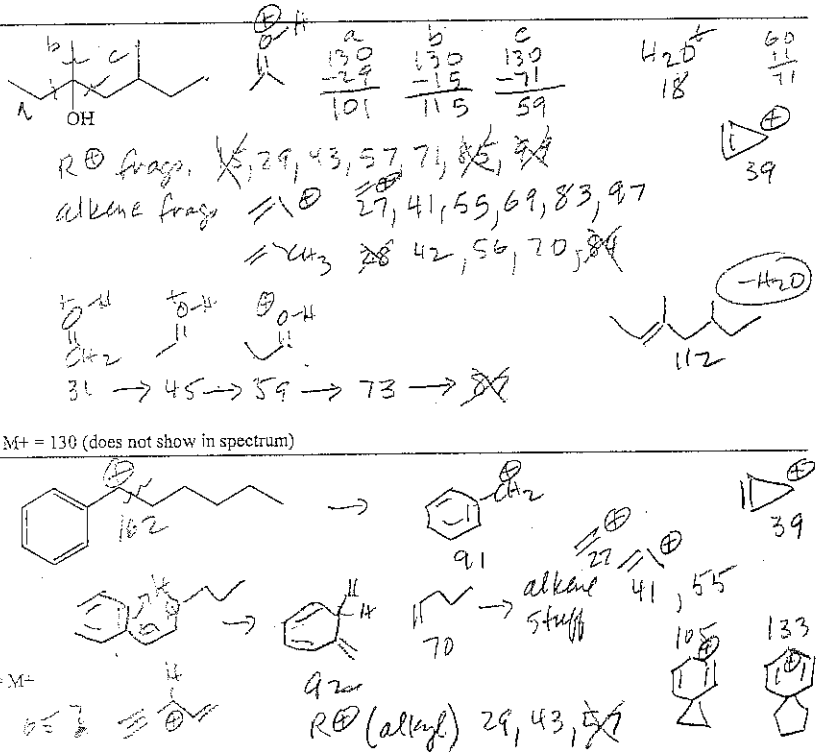
1. Explain any peaks that seem reasonable according to our typical fragmentation patterns. (5 pt s each, judge your time accordingly)

27	14
28	2
29	10
39	6
41	21
42	3
43	100
55	4
57	9
58	43
69	2
71	50
85	16
86	24
99	7
113	32
156	3 = M+



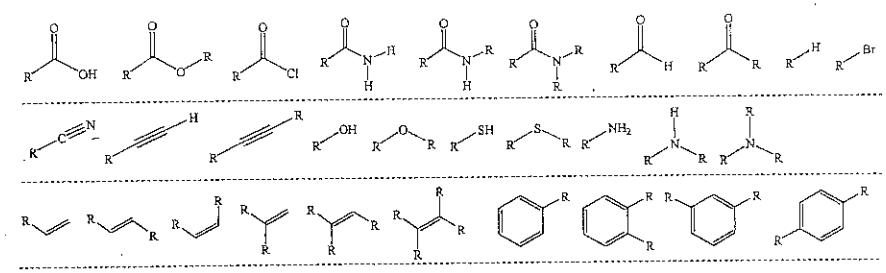
18	2
27	6
29	7
31	3
39	5
41	21
42	4
43	33
45	12
55	48
56	5
57	37
59	22
69	8
70	15
71	4
73	100
83	15
97	4
101	23
112	7
115	7

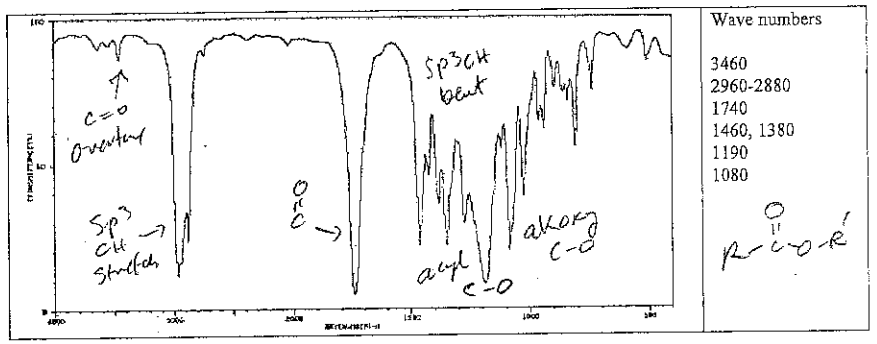
M+ = 130 (does not show in spectrum)

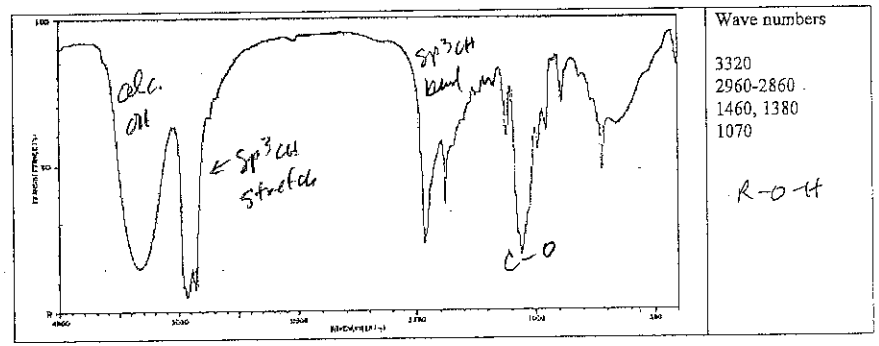


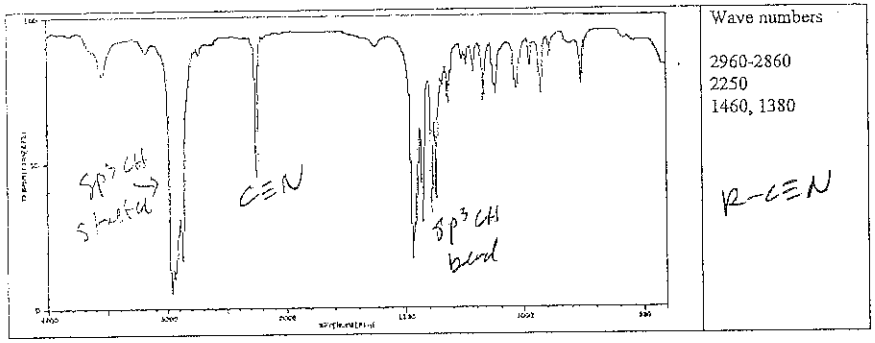
27	5
29	6
39	6
41	8
43	17
55	4
65	9
91	100
92	95
105	11
133	5
162	33 = M+

2. Several structures are shown, but only eight IR spectra are given below. Draw the correct structure in the side box by its corresponding spectrum. Identify the key diagnostic bands in the side box that allow you to make your identification for each spectrum. You can do this directly on the spectrum or in the side box. Interpretation is 1 points and correct structure is 1 pt. (16 pts)





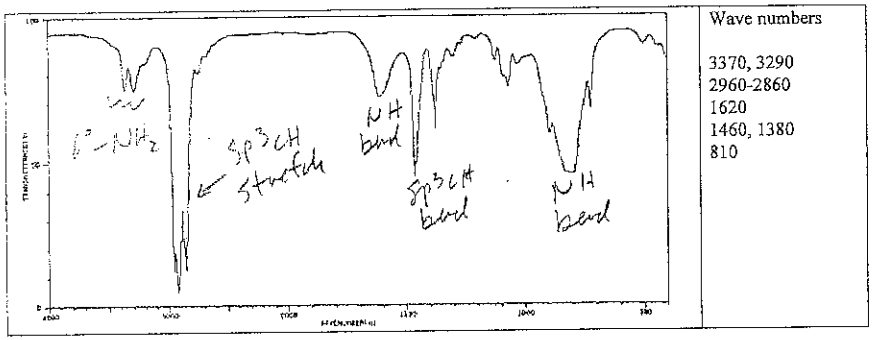




Wave numbers

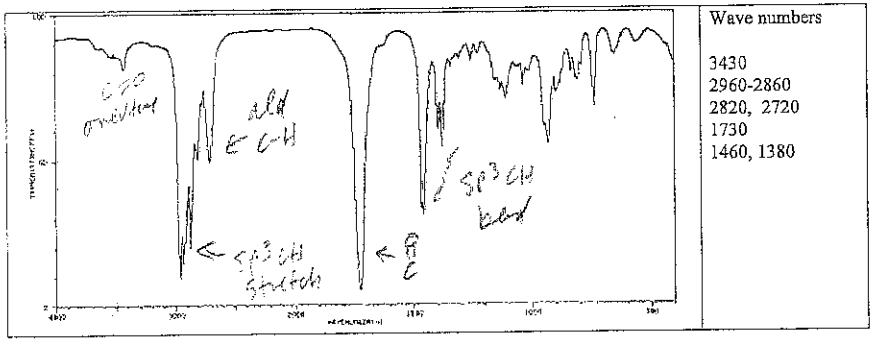
2960-2860
2250
1460, 1380

R-C≡N



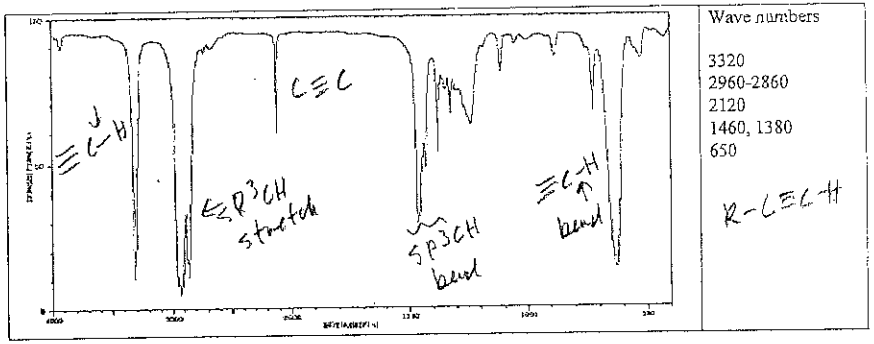
Wave numbers

3370, 3290
2960-2860
1620
1460, 1380
810



Wave numbers

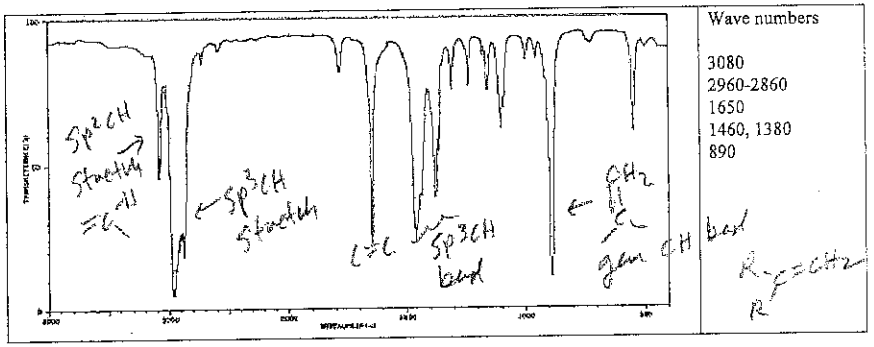
3430
2960-2860
2820, 2720
1730
1460, 1380



Wave numbers

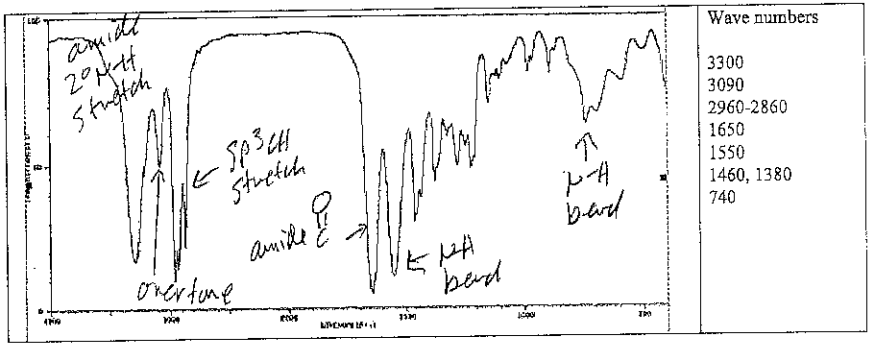
3320
2960-2860
2120
1460, 1380
650

R-C≡C-H



Wave numbers

3080
2960-2860
1650
1460, 1380
890



Wave numbers

3300
3090
2960-2860
1650
1550
1460, 1380
740

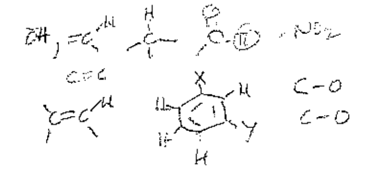
$C_{22}H_{28}N_2O_5$

400 − 264 (C) = 136 − 28 (H) = 108 − 28 (2N) = 80 = 5×O

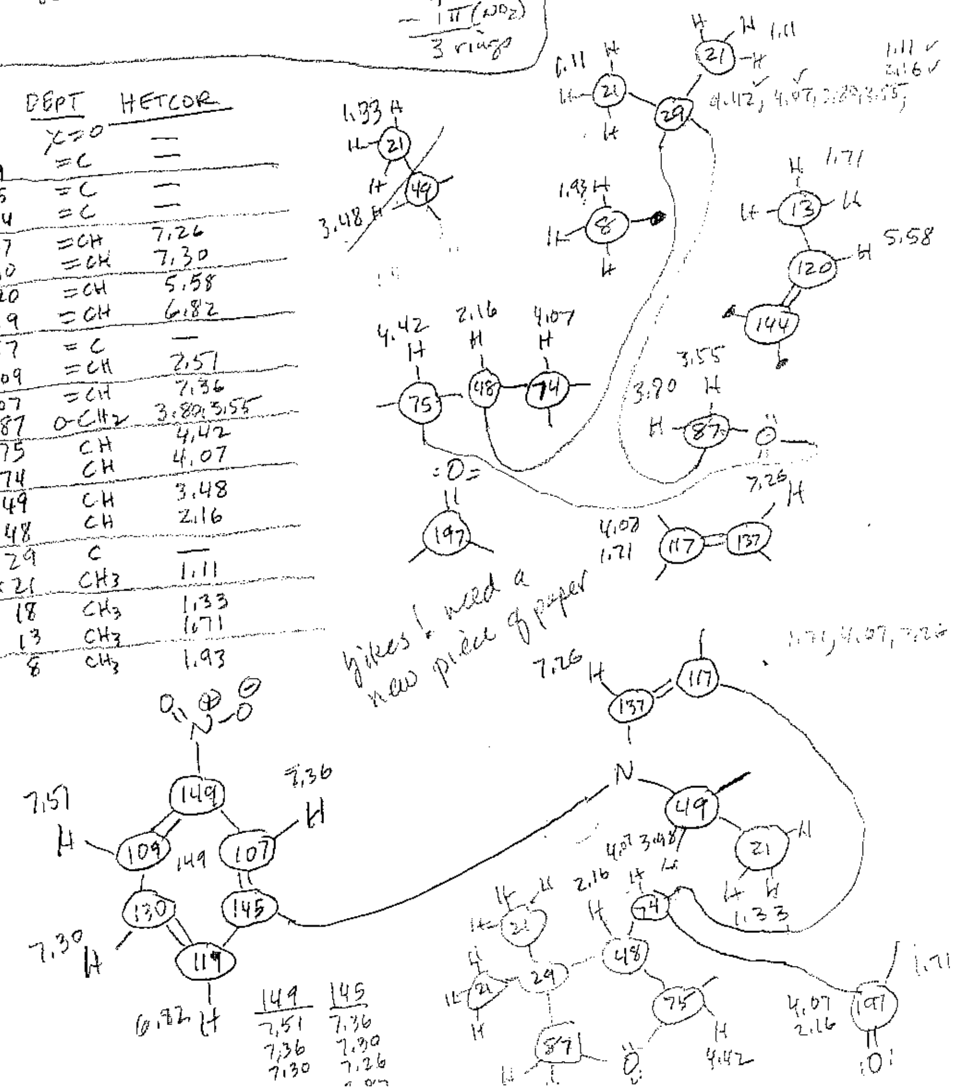
22 × 12 = 264

2(22)+2+2 = 48 − 28 = 20 ÷ 2 = 10°
− 6π = 4 − 1π (NO_2) = 3 rings

IR



13C	DEPT	HETCOR
✓197	C=O	—
✓149	=C	—
✓145	=C	—
✓144	=C	—
✓137	=CH	7.26
✓130	=CH	7.30
✓120	=CH	5.58
✓119	=CH	6.82
✓117	=C	—
✓109	=CH	7.51
✓107	=CH	7.36
✓87	O-CH2	3.80, 3.55
75	CH	4.42
✓74	CH	4.07
✓49	CH	3.48
✓48	CH	2.16
✓29	C	—
✓2 × 21	CH3	1.11
✓18	CH3	1.33
✓13	CH3	1.71
✓8	CH3	1.93



yikes! need a new piece of paper