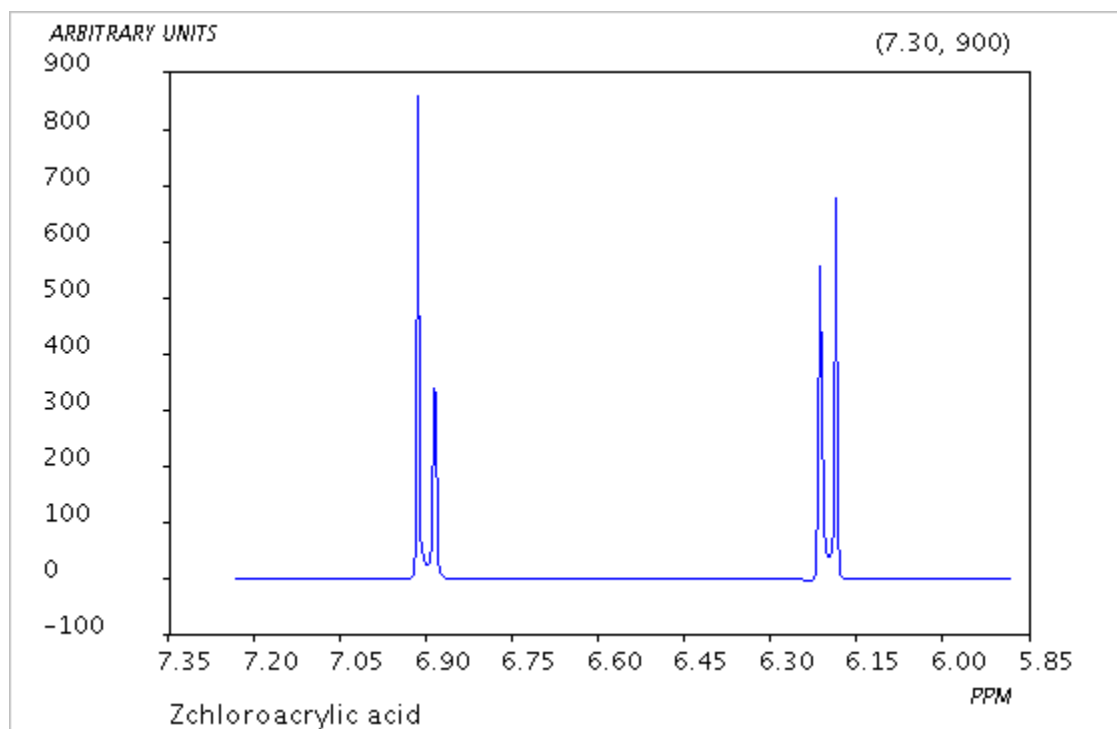


Each of the following spectra show a coupled set of protons. You are also given the integrals for each signal, and a peak listing.

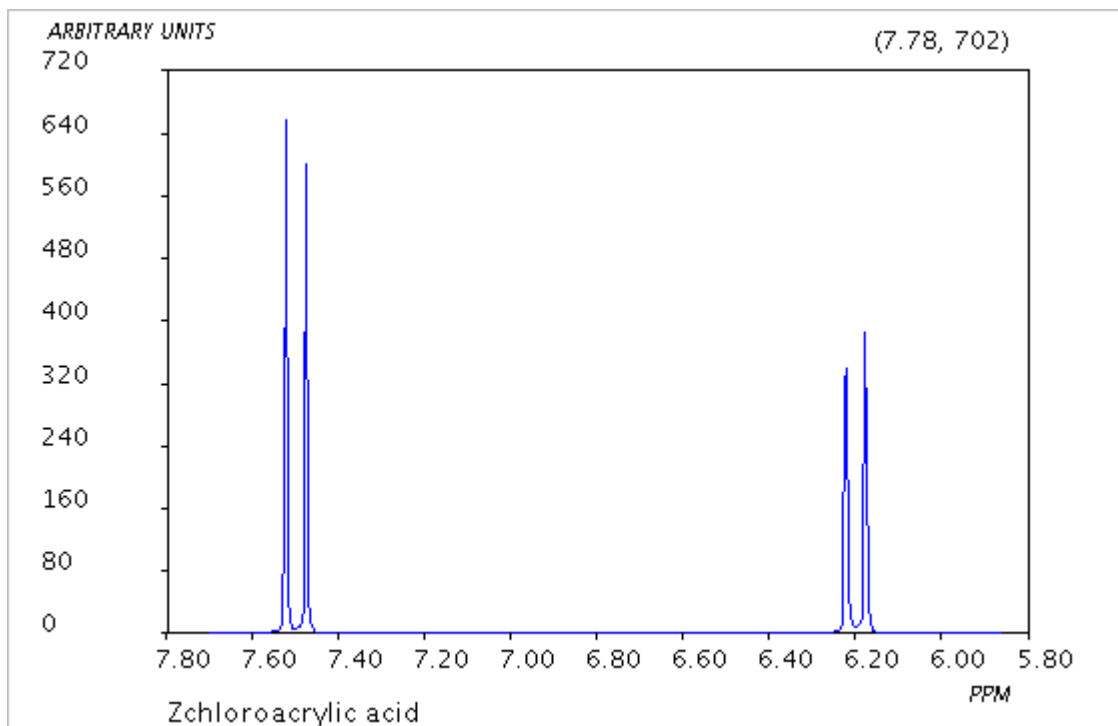
1. Identify how many protons are in each multiplet.
2. Identify the structure of the multiplet (d, t, q, dd, dt, etc.) and how many other protons that group couples to.
3. Identify all J values.



Chemical Shift: Integrals:

6.89: 1
6.20: 1

Frequencies:
2074.5
2066.7
1863.6
1855.8



Chemical Shift: Integrals:

7.55: 1

6.20: 1

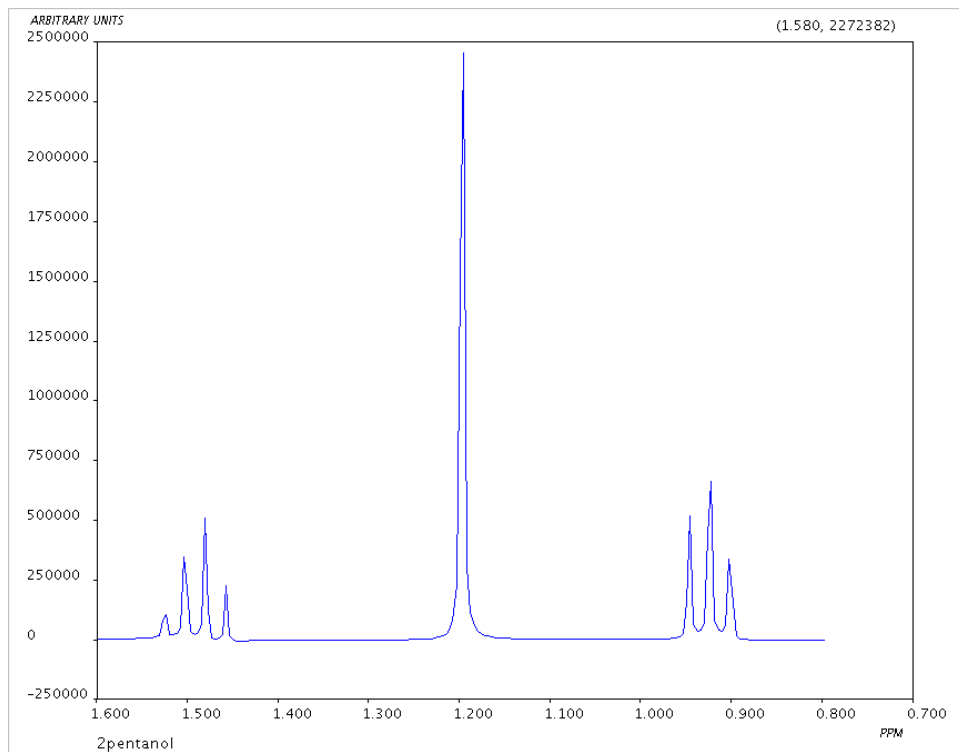
Frequencies:

2256.9

2242.8

1866.6

1853.4



Chemical Shift: Integrals:

1.50: 2

0.92: 3

Frequencies:

457.2

451.2

444.3

437.7

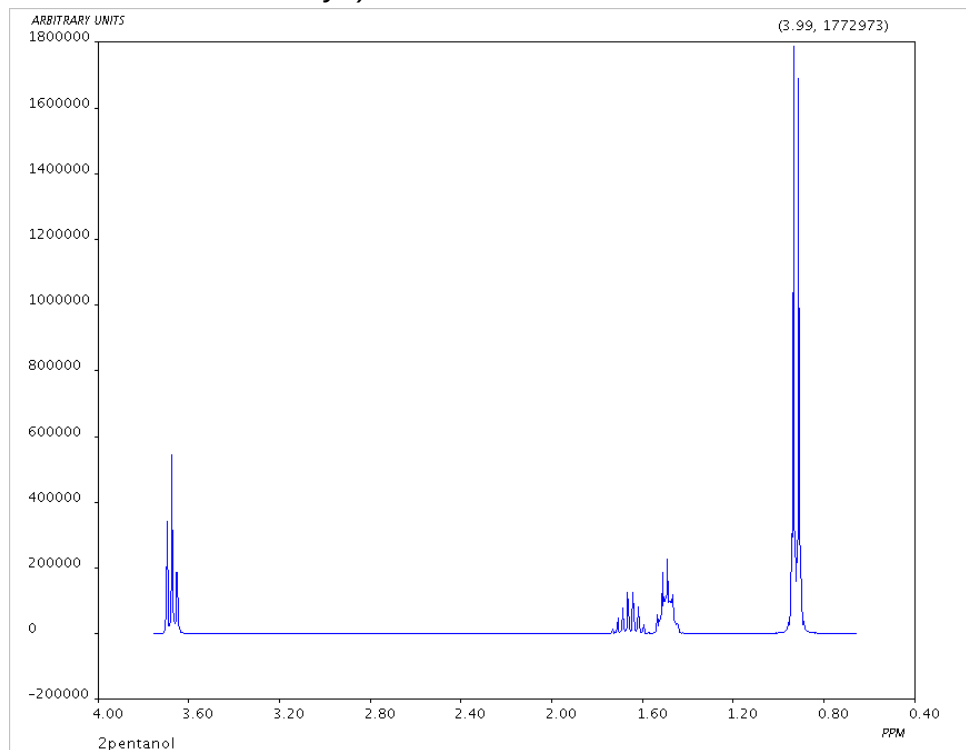
(358.8)

283.8

277.2

270.3

Focus only on the peak at 1.65 ppm. Identify how this is structurally related to other protons in the molecule (how many does it couple to—and where are they?).



Chemical Shift: Integrals:

3.63: 2

1.65: 1

1.51: 2

0.94: 6

Frequencies:

526.5

519.3

512.4

505.5

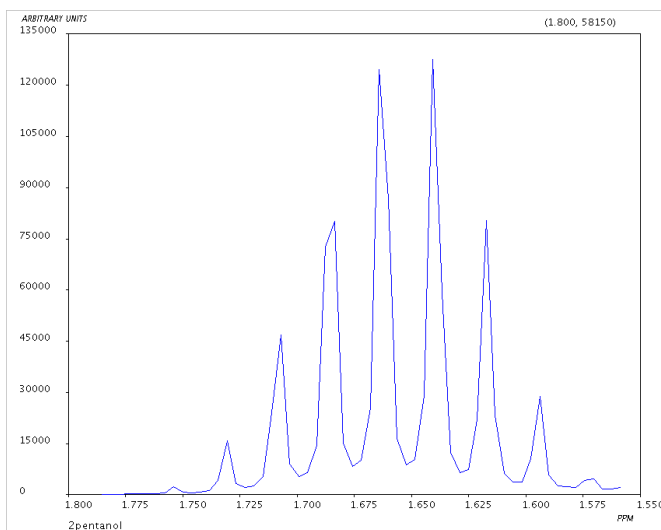
498.6

492.0

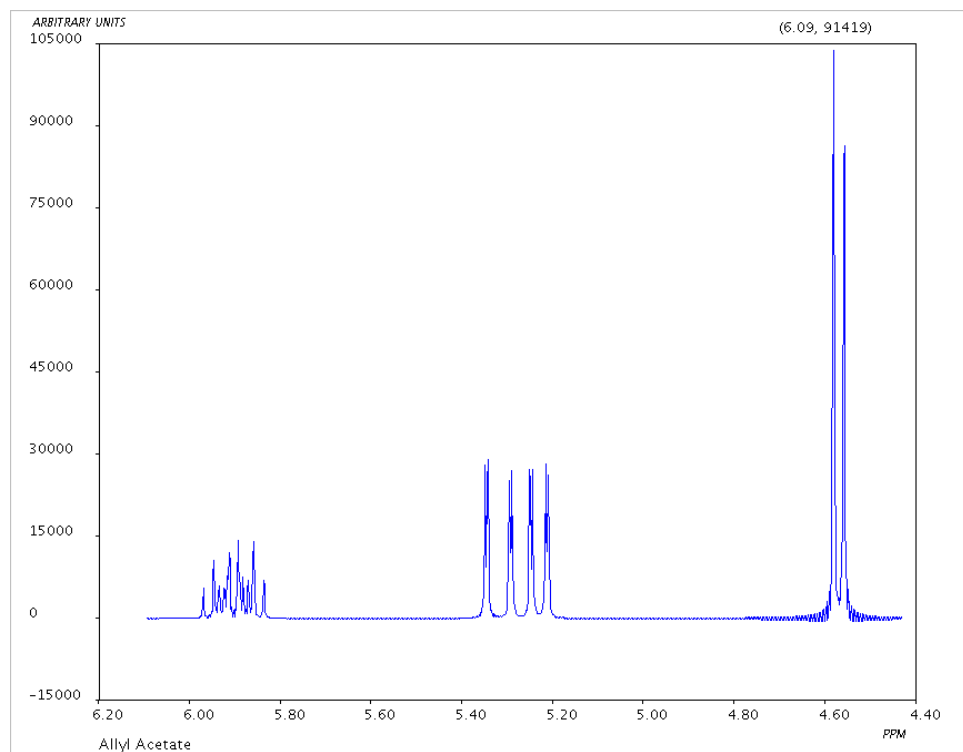
485.7

478.2

471.9



For this problem, focus on the signals at 5.32 and 5.23 ppm.



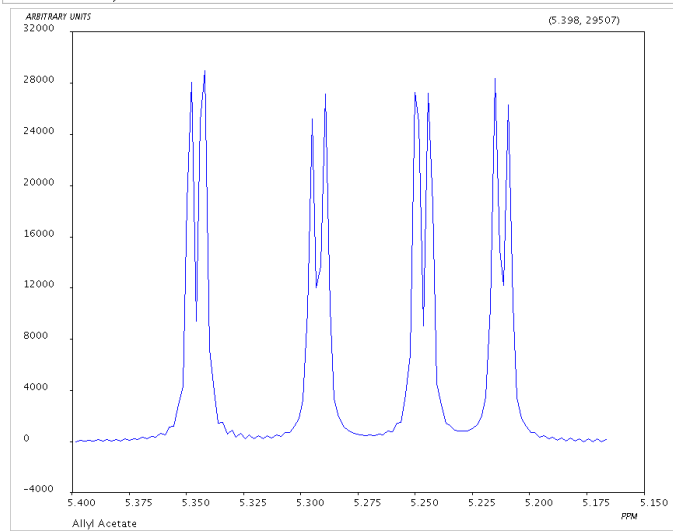
Chemical Shift: Integrals:

5.90: 1

5.32: 1

5.23: 1

4.58: 2



Frequencies:

1604.4

1602.9

1588.5

1586.7

1574.7

1573.2

1564.8

1563.0