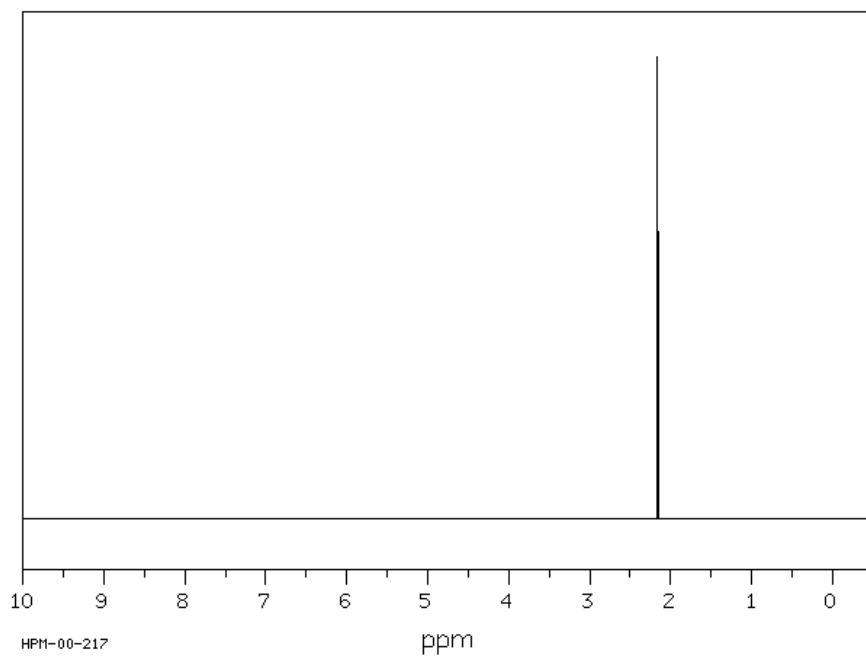
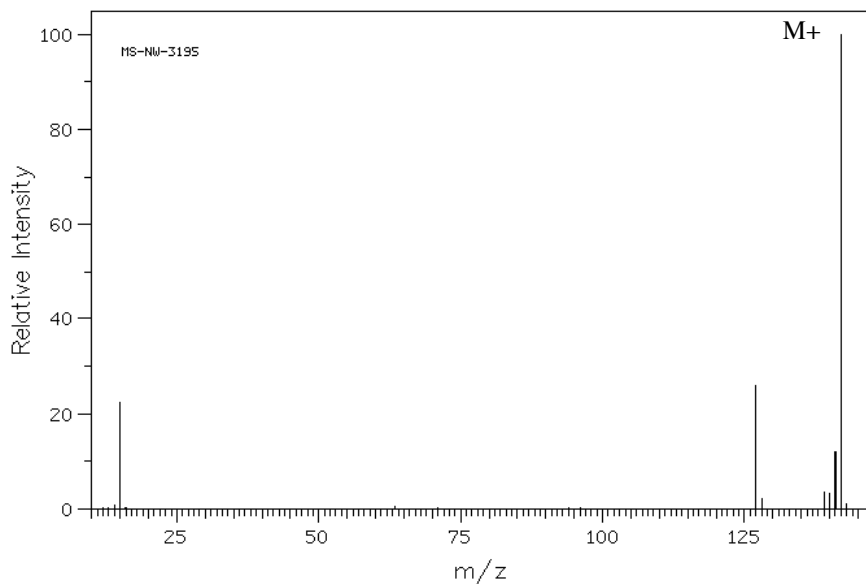


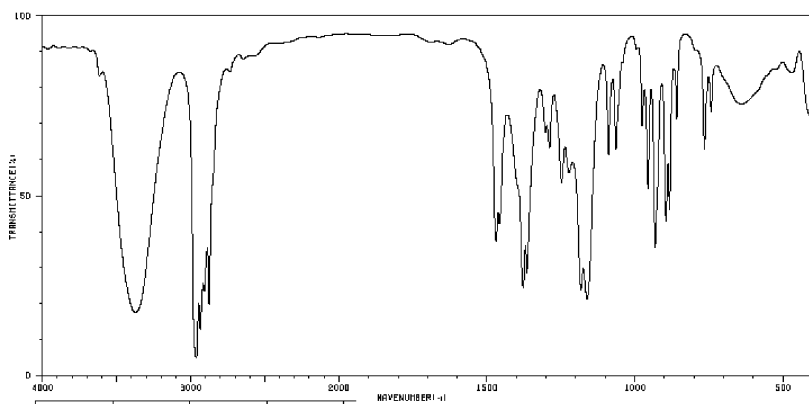
Problem Set 2 5.13 Due February 21, 2003 1PM

1. Compound **A** is reacted in anhydrous diethylether with Mg to give an intermediate that when reacted with compound **B** produces **C** after aqueous workup. What are **A**, **B**, and **C**. Explain how you arrived at your answer.

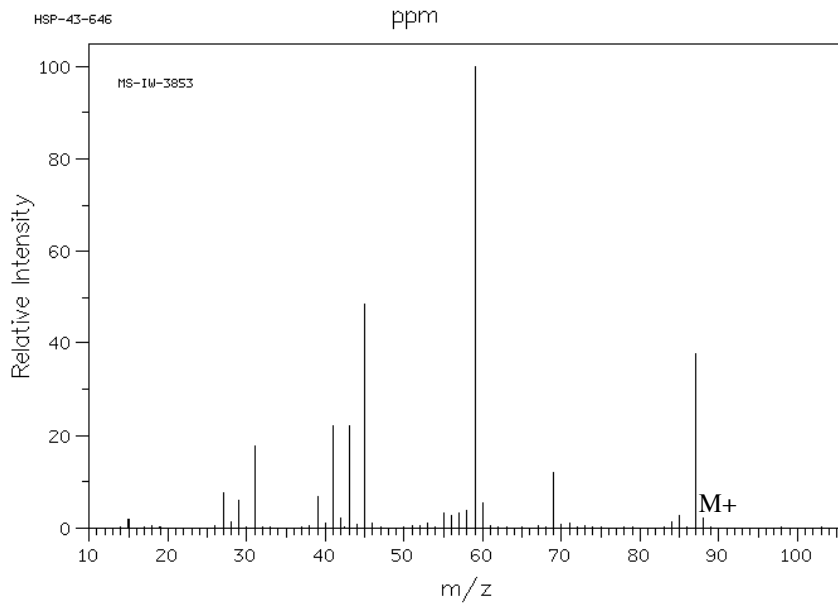
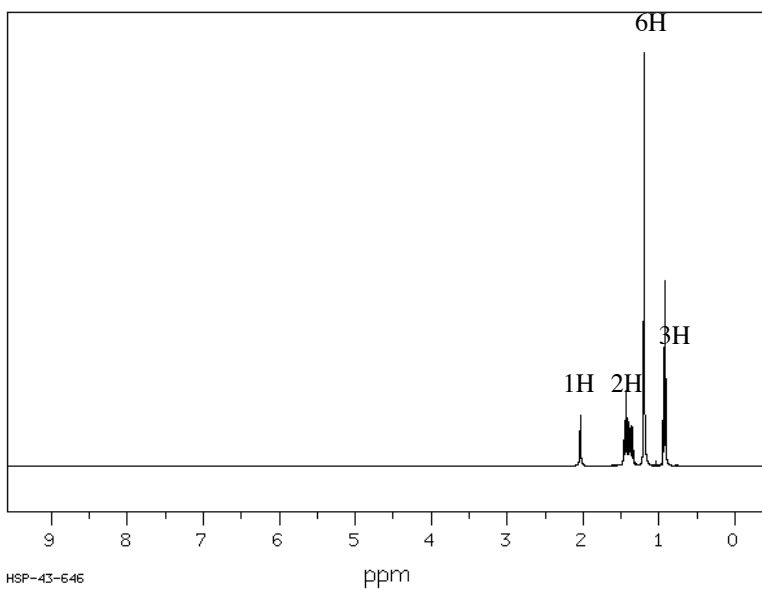
MS and ^1H -NMR of **A**



IR, ¹H-NMR, MS of C (Signal at 2.1 ppm disappears upon D₂O treatment)

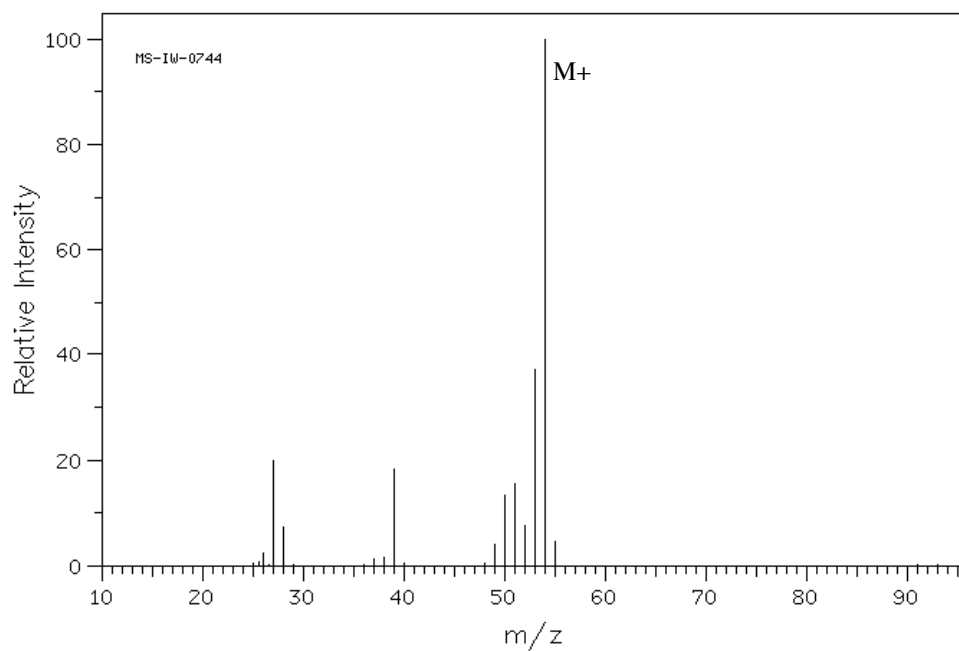
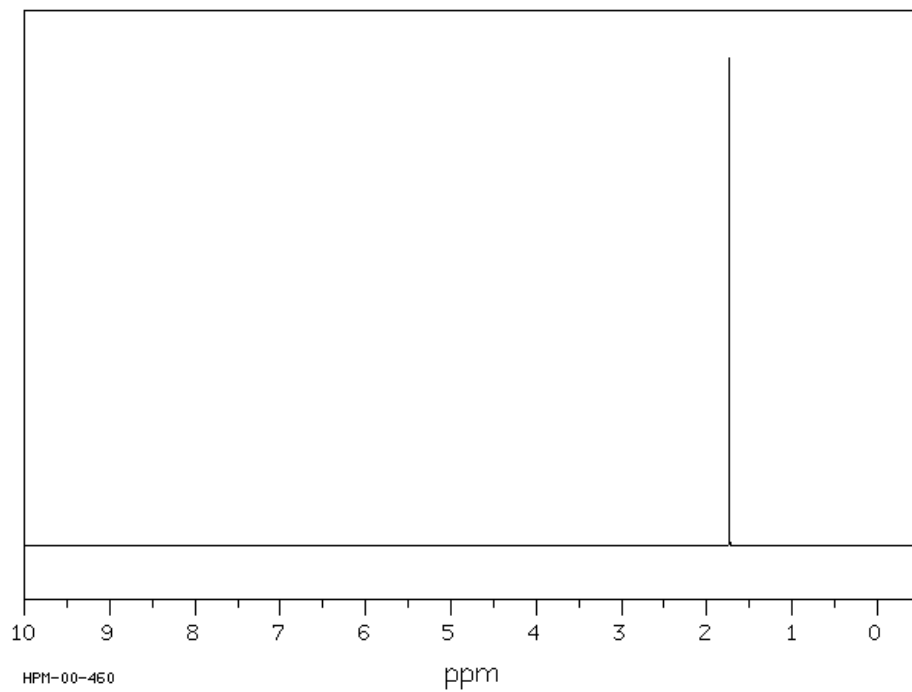


3616	79	1459	41	1183	22	896	41
3373	16	1378	23	1162	20	884	44
2963	4	1365	25	1089	58	859	68
2936	12	1303	64	1064	60	766	60
2907	22	1289	60	976	66	743	70
2876	18	1248	52	956	60	641	72
1469	36	1223	53	831	34	636	72

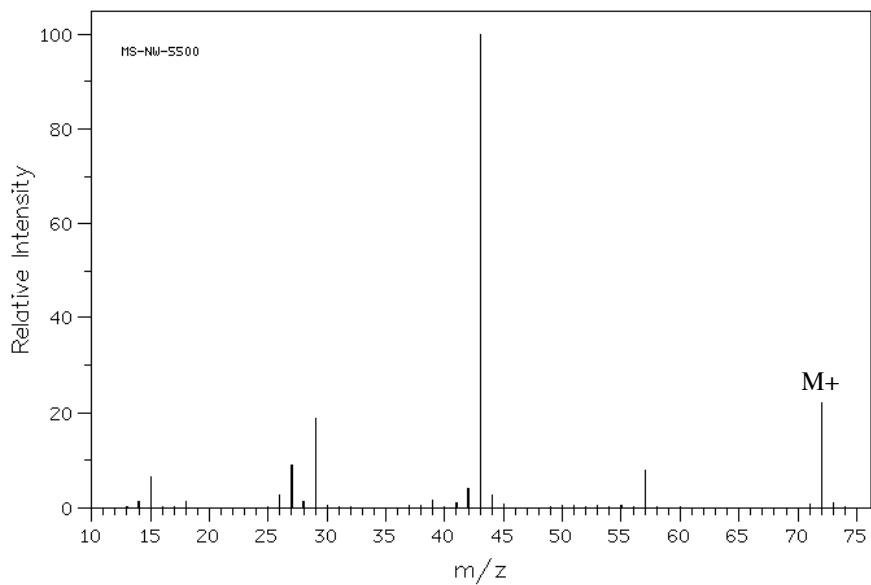
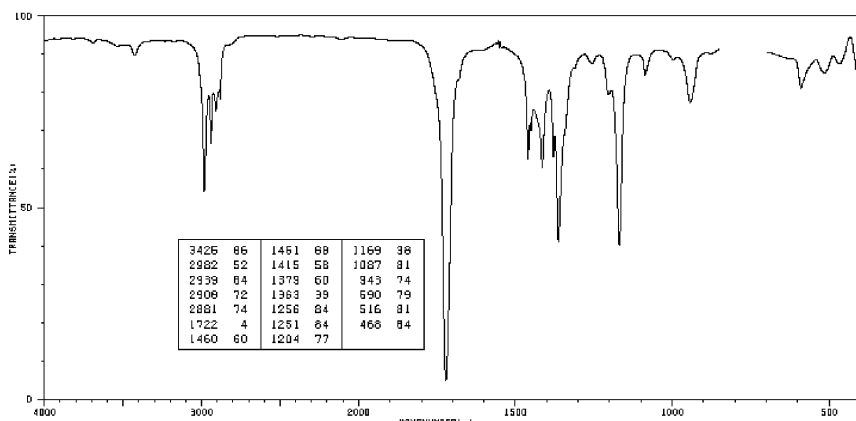
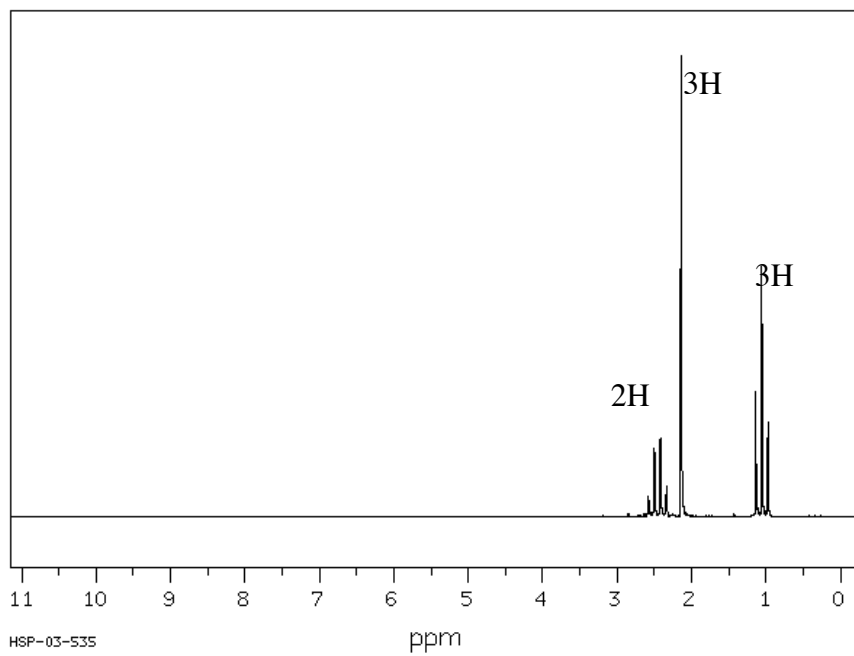


2. Compound **A** when treated with H_2SO_4 (small amount of H_2O) gives compound **B**. Provide the structures of **A** and **B**. Explain how you arrived at your answer.

$^1\text{H-NMR}$ and MS of **A**

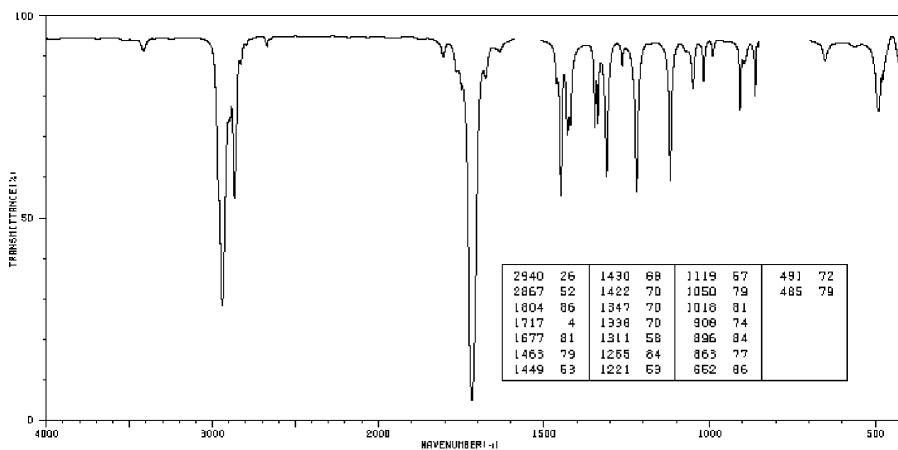
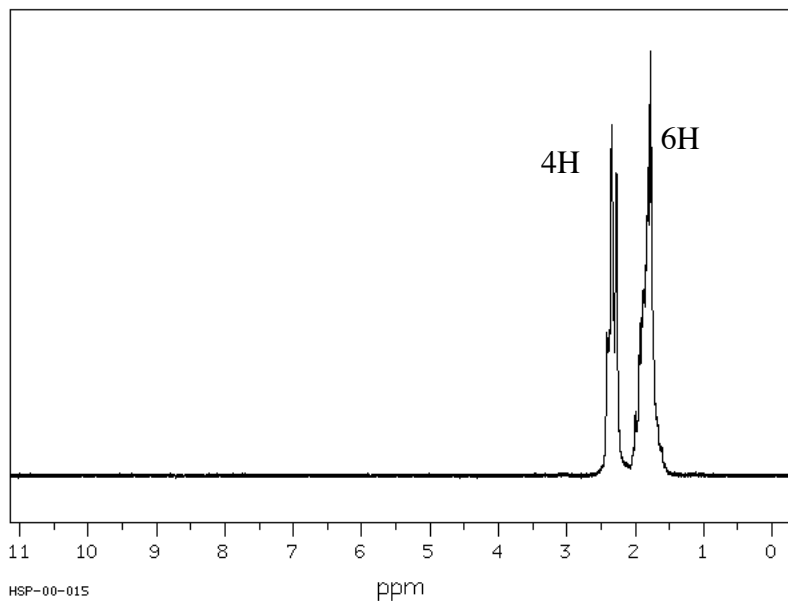


¹H-NMR, IR and MS of **B**

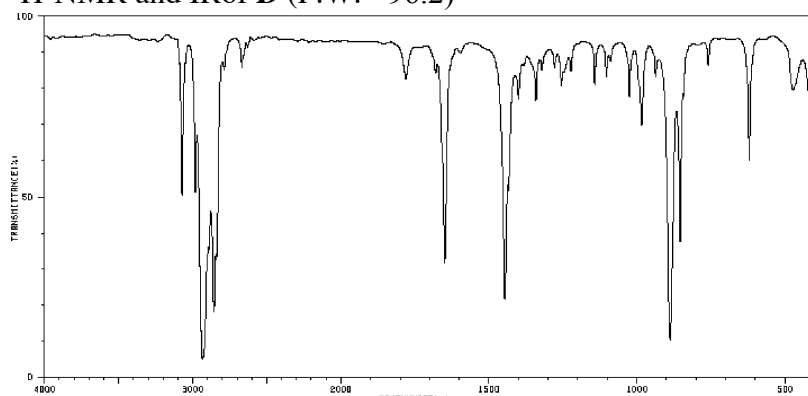


3. Compound **A** (F.W.=94.9, $^1\text{H-NMR}$ singlet at 2.68ppm) is reacted with Triphenylphosphine to give compound **B**. Compound **B** is reacted with n-butyl lithium to give an intermediate that when reacted with compound **C** gives compound **D**. What are the compounds **A**, **B**, **C**, and **D**. Explain how you arrived at your answer.

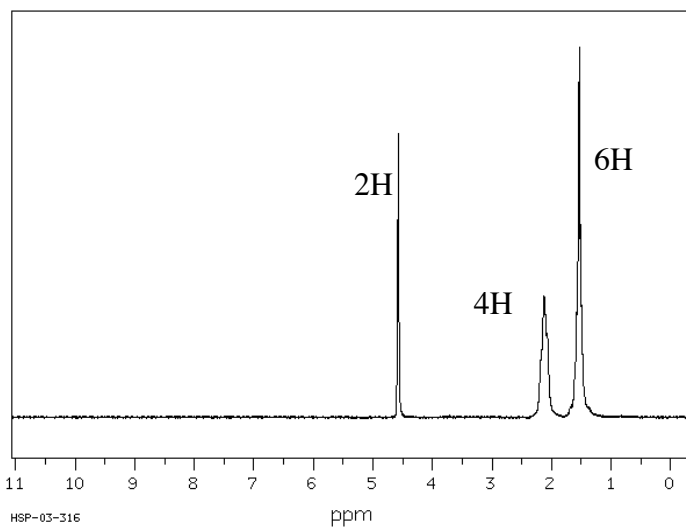
$^1\text{H-NMR}$ and IR of Compound **C** (F.W.= 98.1)



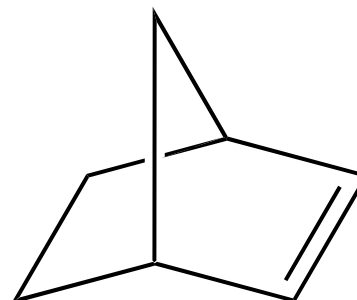
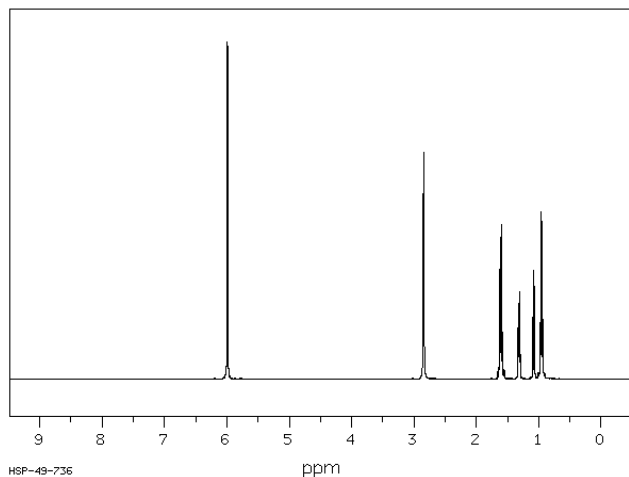
$^1\text{H-NMR}$ and IR of **D** (F.W.= 96.2)



3089	84	2799	81	1434	50	1223	81	888	9
3071	49	2689	81	1400	74	1143	79	854	35
3052	84	1781	78	1341	74	1103	78	758	84
2991	49	1680	81	1322	81	1090	84	621	58
2933	4	1649	50	1279	81	1025	74	472	77
2856	17	1598	65	1256	77	984	68		
2839	31	1446	20	1247	81	937	78		

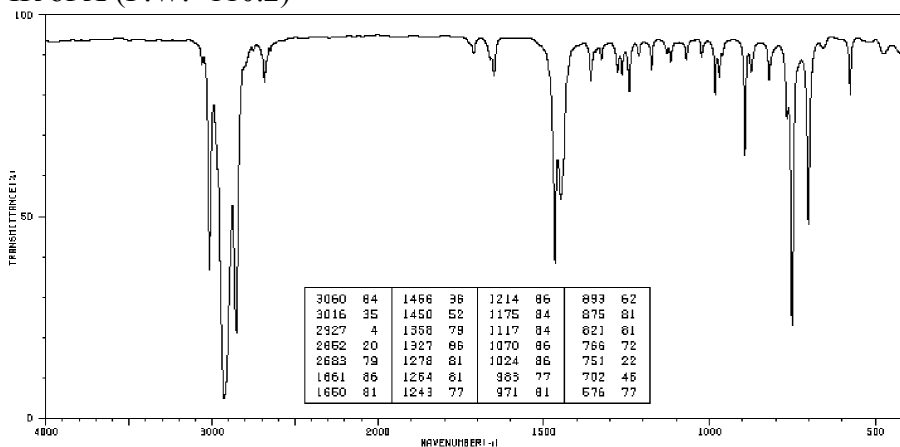


4. The following $^1\text{H-NMR}$ spectrum is of norbornylene. How many types of protons are present and label protons on the chemical structure as being the same or different. Make an educated guess as to which protons correspond to which signals. Explain your answer.

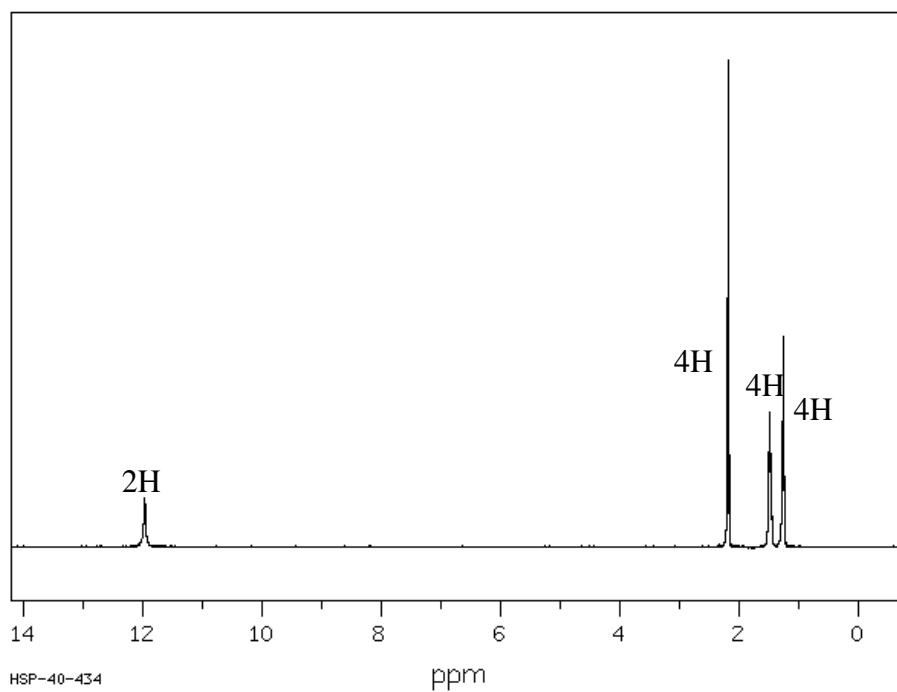


5. Compound **A** is treated with warm concentrated KMnO_4 to give compound **B**. Provide the structures of **A** and **B**. Explain how you arrived at your answer.

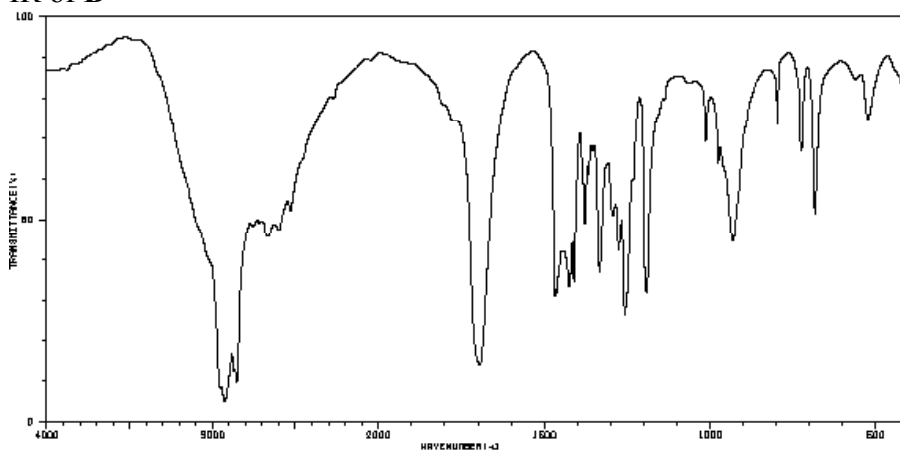
IR of **A** (F.W.=110.2)



¹H-NMR of **B** (F.W.= 174.2)

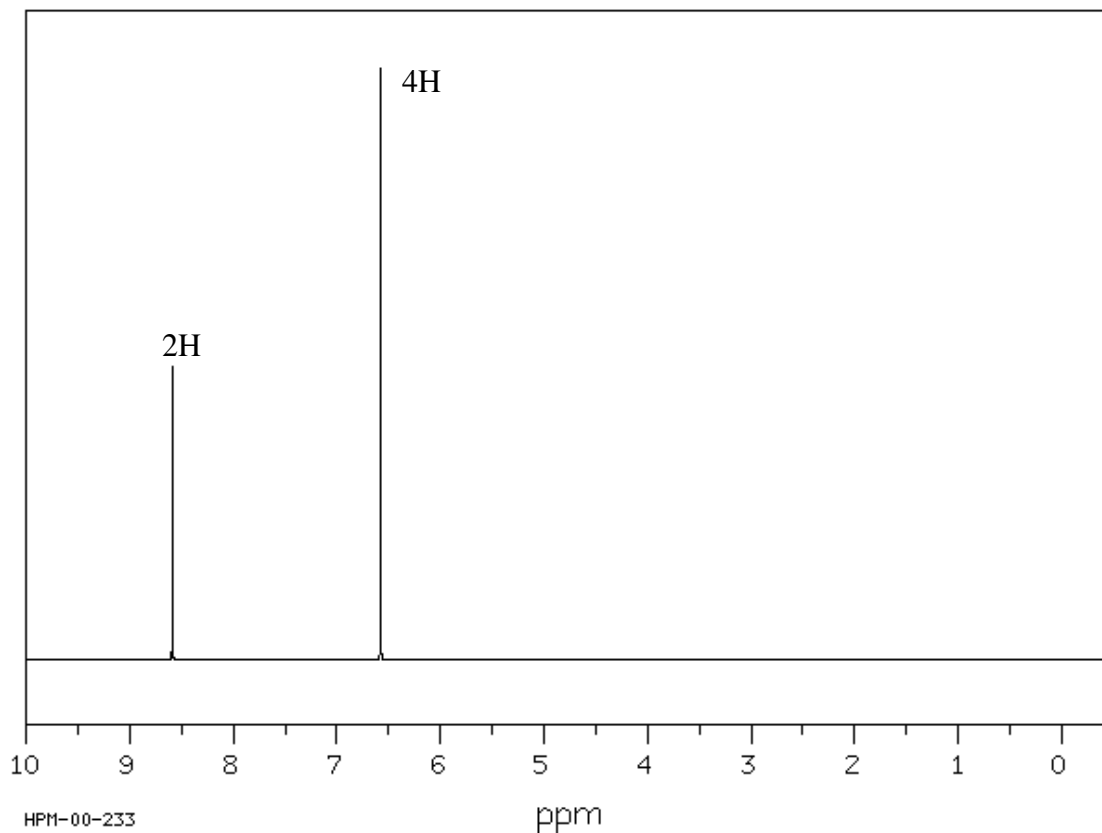


IR of **B**



6. Aromatic compound **A** (F.W.= 110.1) is oxidized by FeCl_3 to give **B** (F.W. 108.1). Provide the structures of **A** and **B**. Explain how you arrived at your answer.

NMR of **A** (the signal at 8.6 ppm disappears with D_2O treatment).



¹H-NMR and IR of **B**

