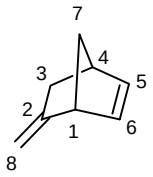
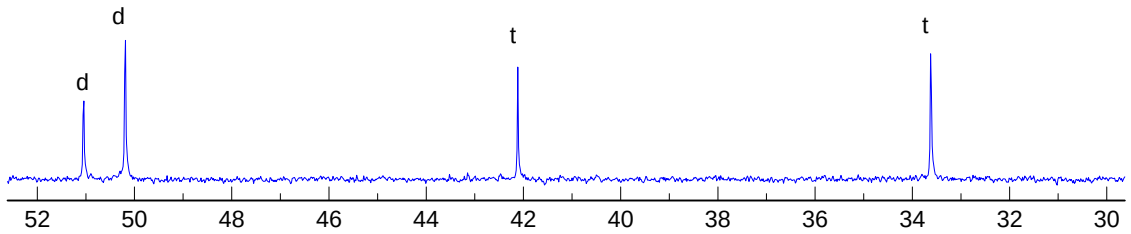
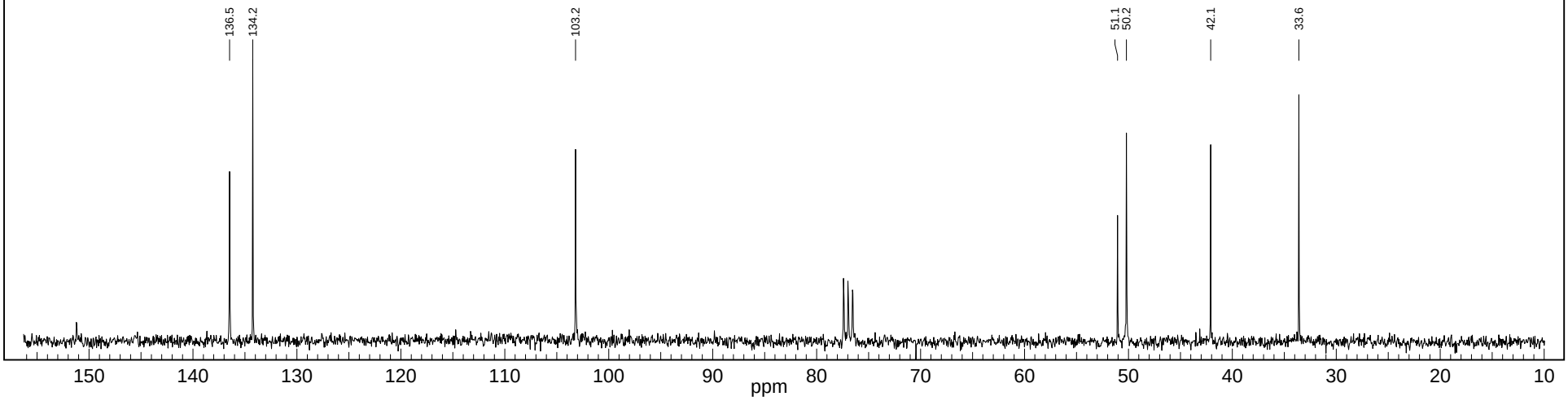
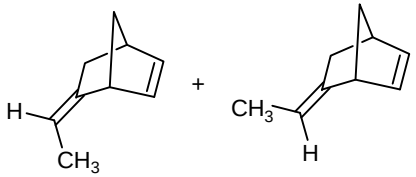
Problem R-03E. (C_8H_{10})
75 MHz ^{13}C NMR Spectrum in $CDCl_3$
Source: Aldrich Spectra Collection

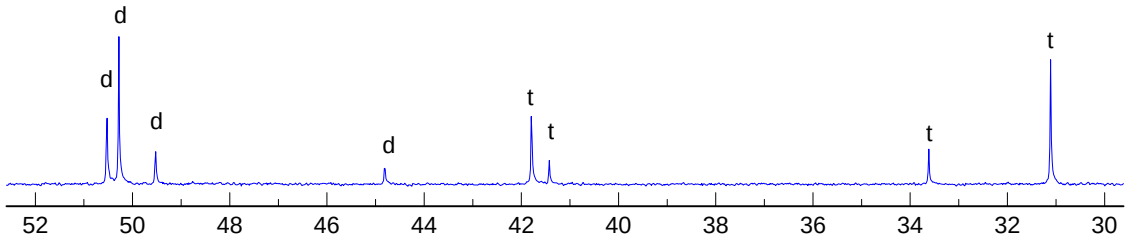


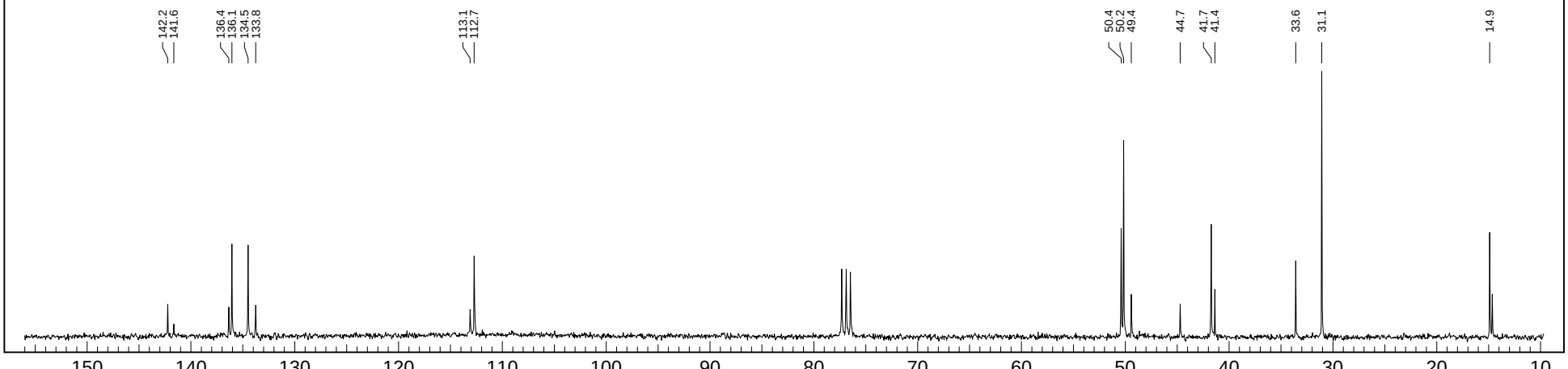




C_9H_{12}: 75 MHz ^{13}C NMR Spectrum in $CDCl_3$



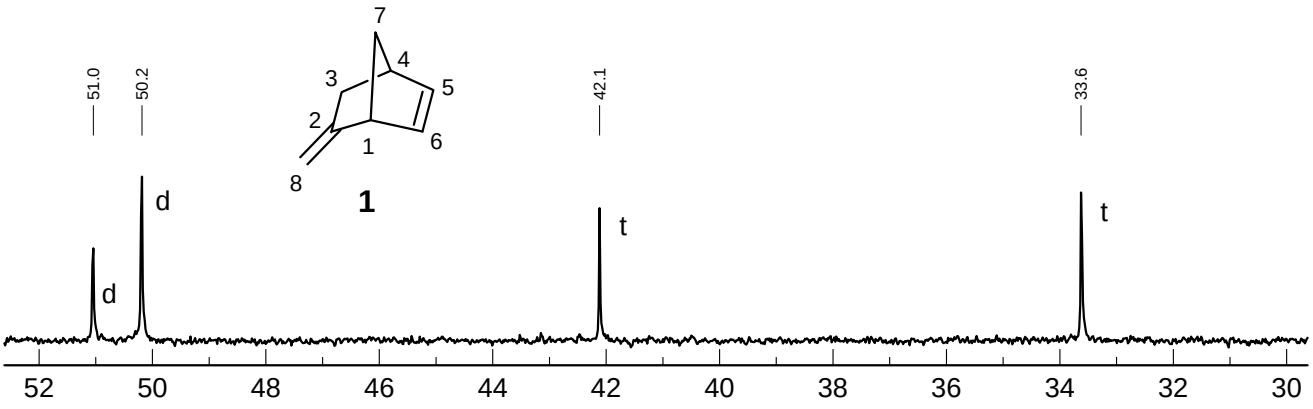




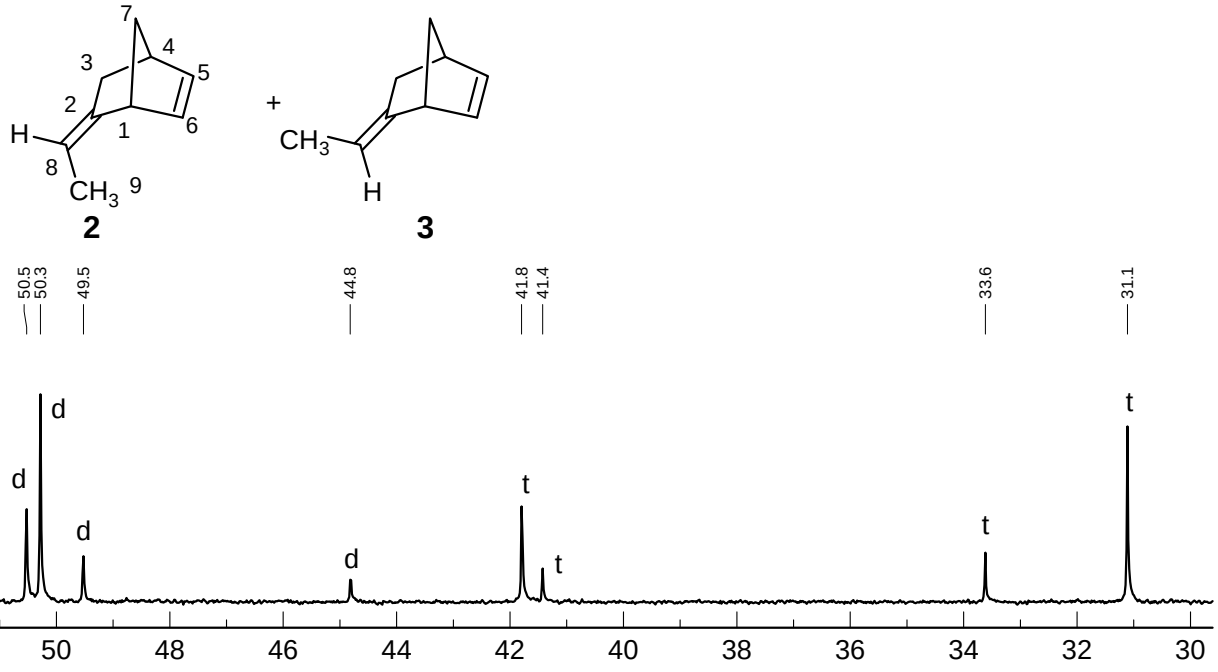
PLT ex-1-03-g.plt

Problem R-03E. Below are given the aliphatic carbons of ^{13}C NMR spectra of 2-methylenebicyclo[2.2.1]heptene, and the ^{13}C NMR spectrum of a mixture of stereoisomeric 2-ethylidenebicyclo[2.2.1]heptenes (complete spectra are shown on the following page). Your task is to assign some of the resonances and determine which isomer is which in the mixture of isomers. (Source: Aldrich Spectra Viewer).

(a) Assign the aliphatic signals of **1** by writing the δ values next to the appropriate carbons



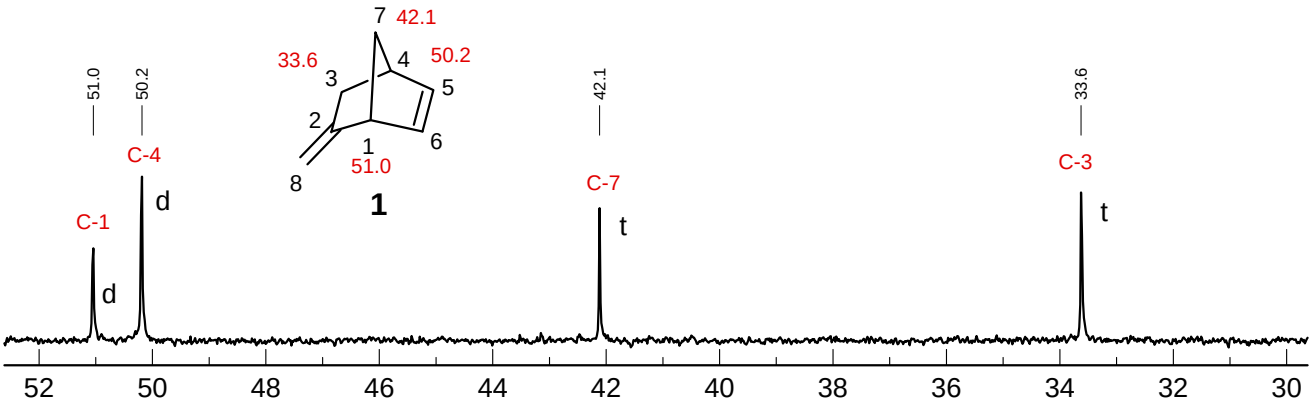
(b) Assign the aliphatic signals of compounds **2** and **3** by writing the δ values next to the appropriate carbons



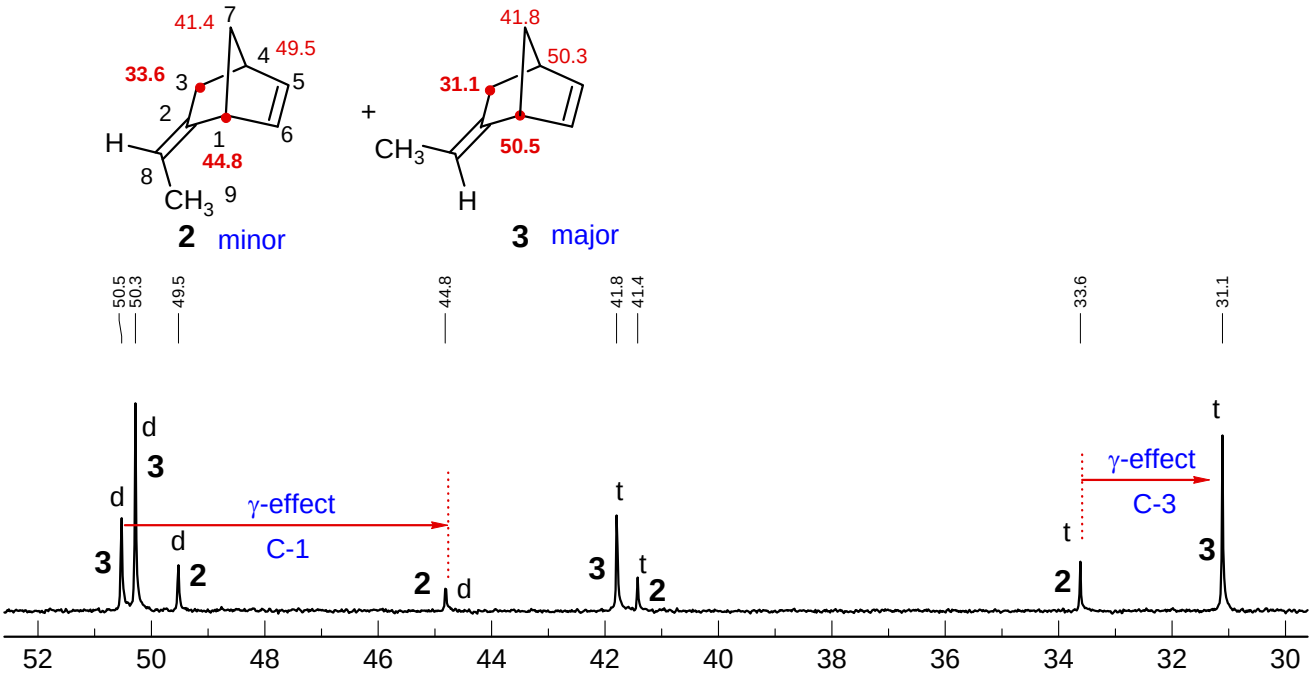
(c) Which isomer (**2** or **3**) is the major one?____ Briefly explain the basis for your assignment of structure. Be specific. Use the numbering scheme shown in your answer.

Problem R-03E. Below are given the aliphatic carbons of ^{13}C NMR spectra of 2-methylenebicyclo[2.2.1]heptene, and the ^{13}C NMR spectrum of a mixture of stereoisomeric 2-ethylidenebicyclo[2.2.1]heptenes (complete spectra are shown on the following page). Your task is to assign some of the resonances and determine which isomer is which in the mixture of isomers. (Source: Aldrich Spectra Viewer).

(a) Assign the aliphatic signals of **1** by writing the δ values next to the appropriate carbons



(b) Assign the aliphatic signals of compounds **2** and **3** by writing the δ values next to the appropriate carbons



(c) Which isomer (**2** or **3**) is the major one? **3** Briefly explain the basis for your assignment of structure. Be specific. Use the numbering scheme shown in your answer.

In compound **3**, C-3 should see a γ-effect and be upfield of C-3 in **1** and **2**. The minor isomer has a C-3 chemical shift almost identical to that of **1**, thus it must be **2**. The major isomer is then **3**. Similar argument for C-1, which should be upfield in **2** compared to those in **1** and **3**. Chemical shifts for C4 and C-7 should be close in both isomers.