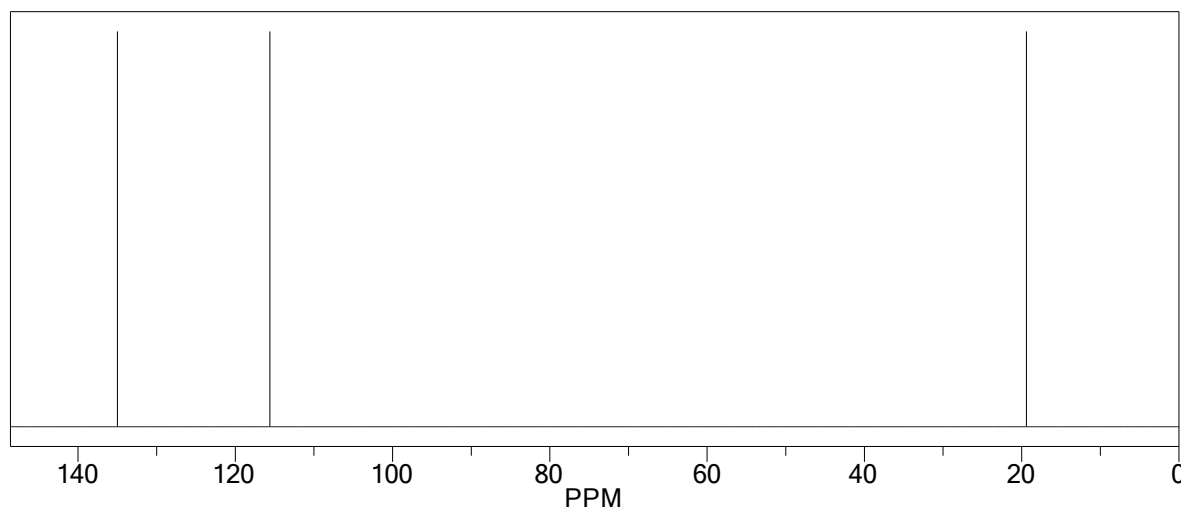


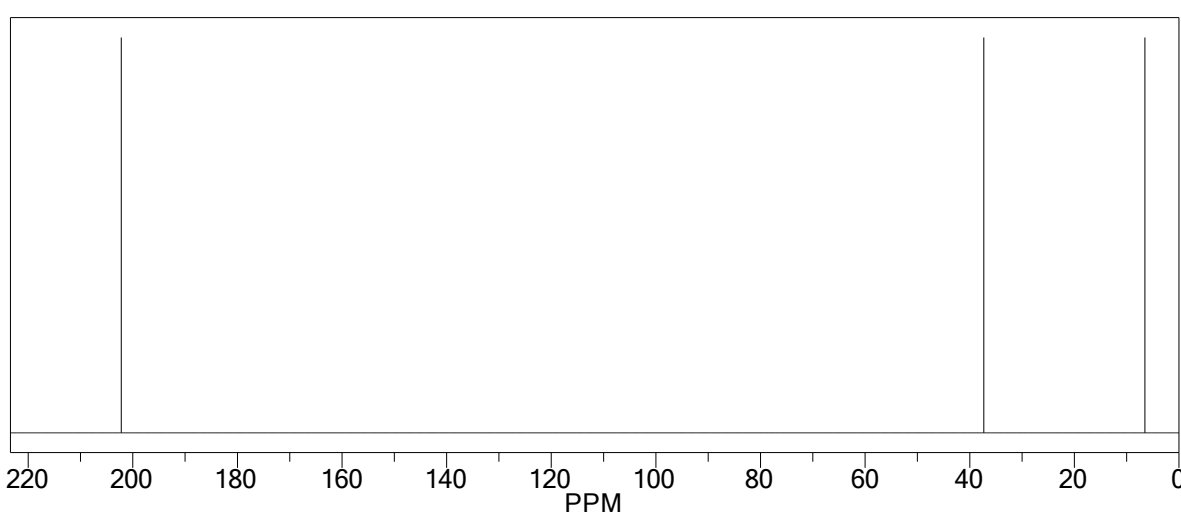
Many reactions can occur with primary alcohol such as propan-1-ol

Using the ^{13}C NMR data below, identify the product, the type of reaction and reagent associated with the reaction.

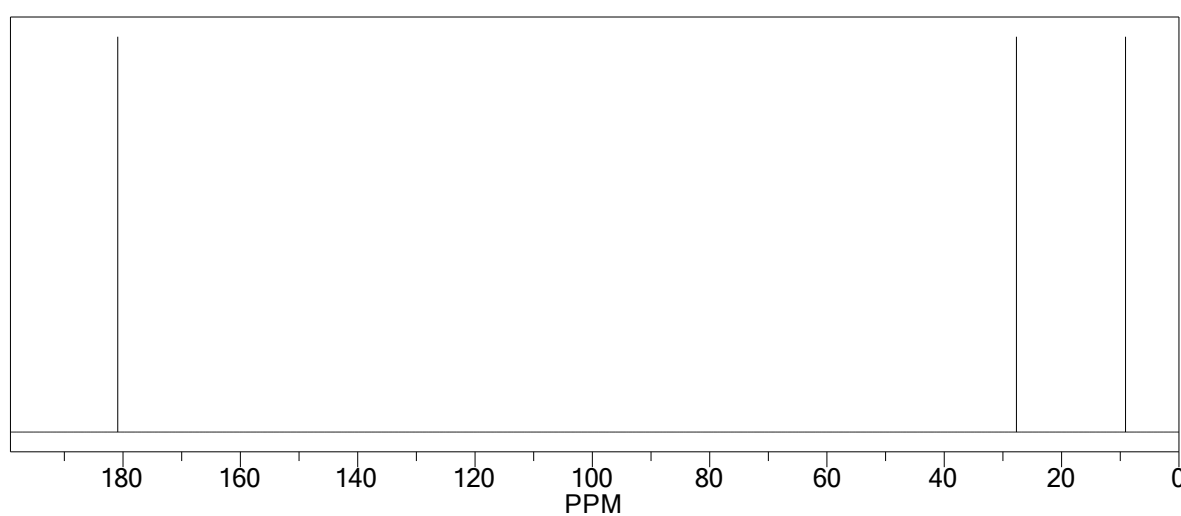
Compound A **Answer Propene**



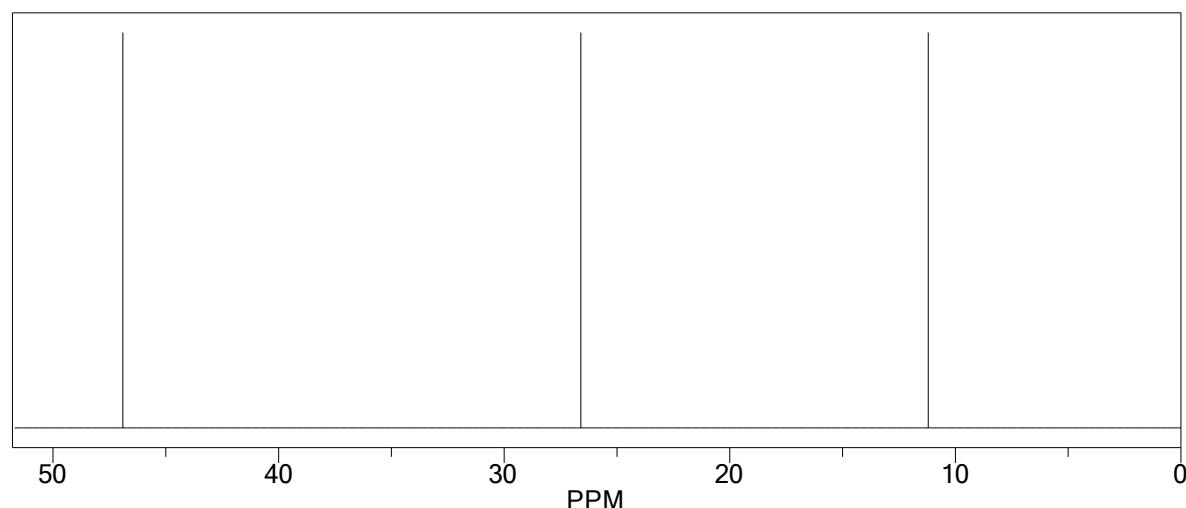
Compound B **Answer Propanal**



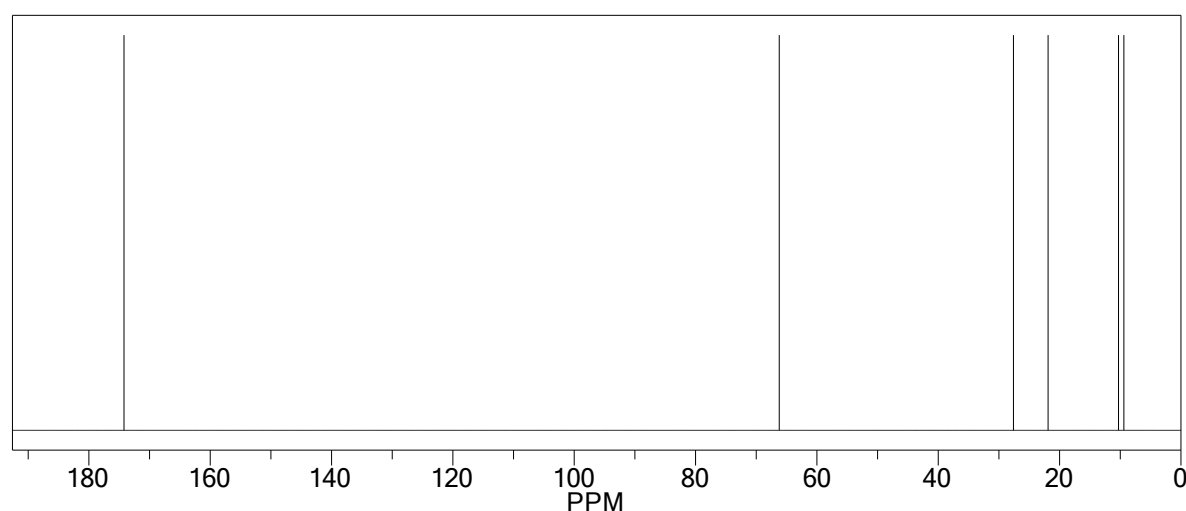
Compound C **Answer Propanoic acid**



Compound D Answer 1-chloro propane



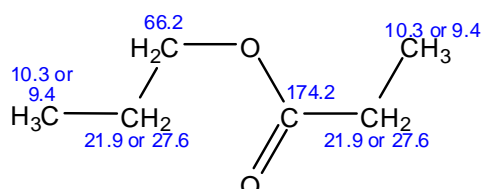
Propan-1-ol can react with one of the compound above and produce compound E



Discuss compound E

Compound E is an Ester named propyl propanoate. It can be formed by reacting compound C (propanoic acid) and propan-1-ol under reflux with the aid of a dehydrating agent, concentrated H₂SO₄. This is a condensation reaction because the two organic molecules are joined together by removing a smaller molecule, in this case, water H₂O.

Compound E has 6 carbon environments, as shown in the ¹³C NMR with 6 distinct peaks.



The highly electropositive carbon in the ester group gives rise to the peak on 175ppm.

The peak on 66.2 ppm is due to the carbon bonded directly to an oxygen atom.

The two peaks on the 20 to 30 ppm region are the carbons bonded to a carbon containing an oxygen atom.

Finally the two peaks around the 10 ppm region are the "normal" alkyl carbon that is not influenced by the electronegative atoms in the molecule.

The MS should show the molecular ion peak at 116 m/z.

The IR spectrum for compound E should show several distinct peaks.

C-H 3100 – 2800 cm⁻¹ C=O 1850 – 1600 cm⁻¹ C-O 1250 – 1050 cm⁻¹