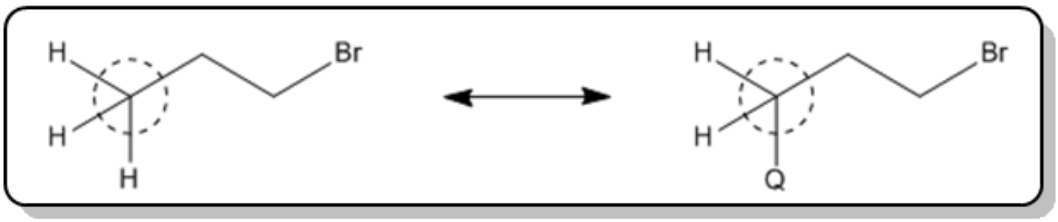
CONCEPT: ^{1}H NMR – PROTON RELATIONSHIPS

Hydrogens attached to the same carbon actually do have *different relationships* based on their chirality.

□ The **Q-Test** is used to determine the specific type of chirality of each hydrogen.

a. Homotopic Protons

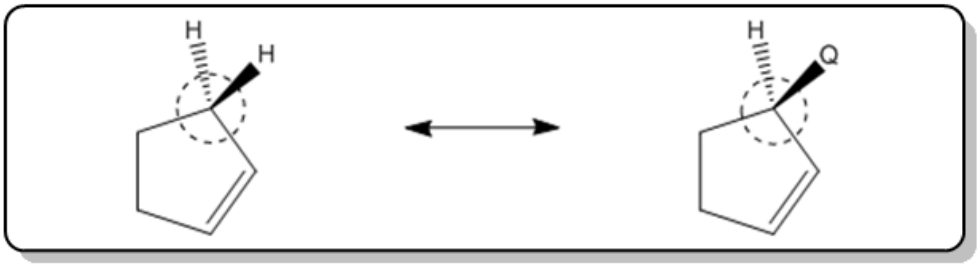
Q-Test ***DOES NOT*** yield new chiral center



- Protons are ***always homotopic*** and are considered _____ (They share a signal)
- In general, the three hydrogens on -CH_3 groups will always be homotopic

b. Enantiotopic Protons

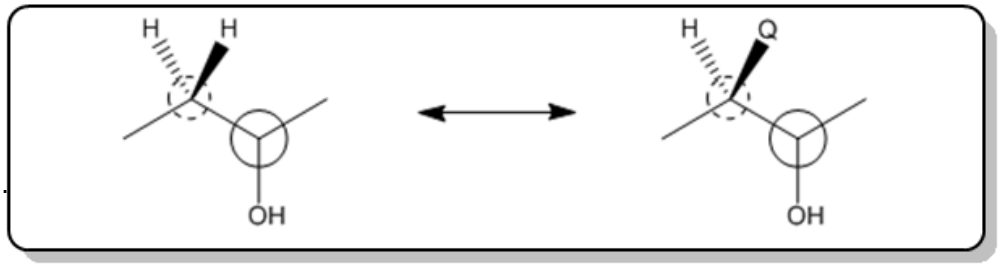
Q-Test ***DOES*** yield new chiral center



- No original chiral centers = protons are still _____ (They share a signal)

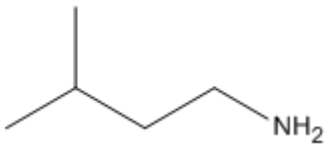
c. Diastereotopic Protons

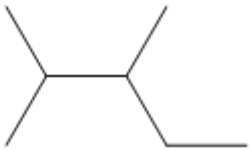
Q-Test ***DOES*** yield new chiral center

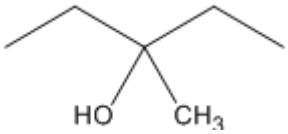


- 1+ original chiral centers = protons are now _____ (Each proton gets its own signal)

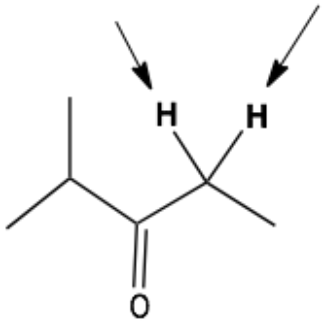
EXAMPLE**:** How many signals will each molecule possess in ^{1}H NMR?

a. 

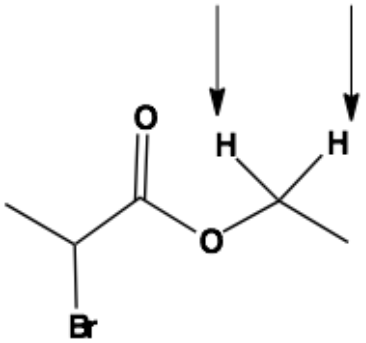
b. 

c. 

PRACTICE: Identify the indicated set of protons as unrelated, homotopic, enantiotopic, or diastereotopic.



PRACTICE: Identify the indicated set of protons as unrelated, homotopic, enantiotopic, or diastereotopic.



PRACTICE: Identify the indicated set of protons as unrelated, homotopic, enantiotopic, or diastereotopic.