

Short Answer:

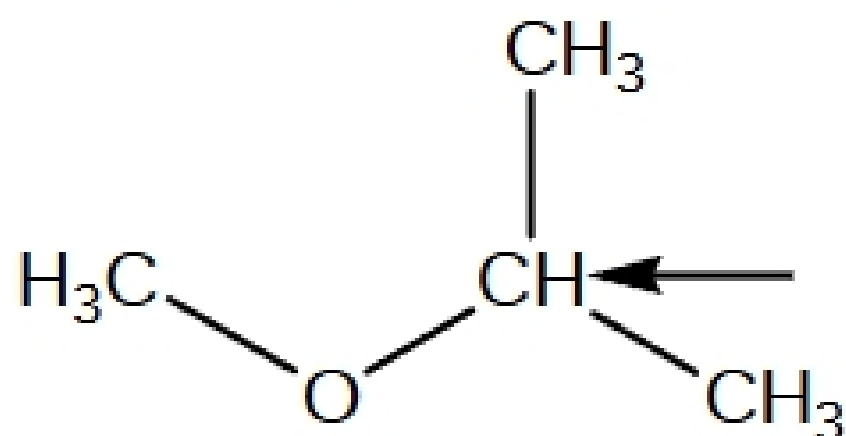
1) What type of electromagnetic radiation is used in nuclear magnetic resonance?

radio

2) What is the most abundant peak in a mass spectrum called?

Base peak

3) What would the proton NMR peak look like for the indicated hydrogen?

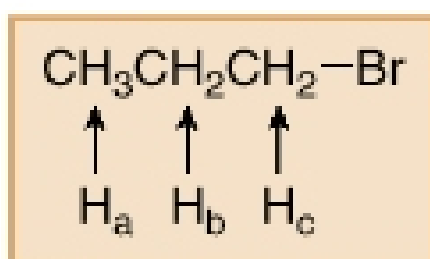


Because the two sets of adjacent protons are equivalent this peak would follow the $n+1$ rule and be a septet.

Nuclear Magnetic Resonance Spectroscopy

^1H NMR—Spin-Spin Splitting

When two sets of adjacent protons are different from each other (n protons on one adjacent carbon and m protons on the other), the number of peaks in an NMR signal = $(n + 1)(m + 1)$.



Three H_a protons split the H_b signal into $3 + 1 = 4$ peaks.

Two H_c protons further split the H_b signal into $2 + 1 = 3$ peaks.

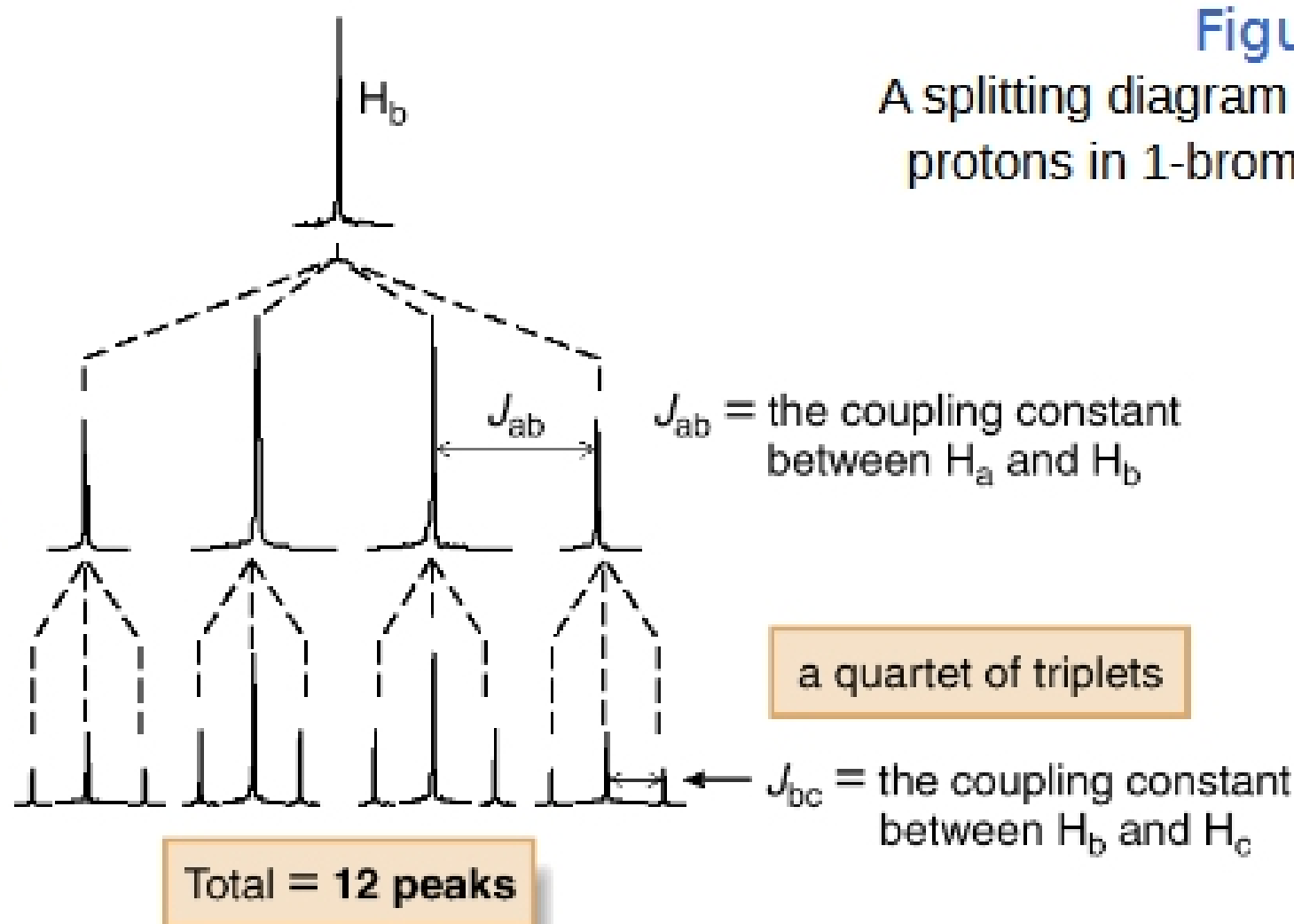


Figure 14.8

A splitting diagram for the H_b protons in 1-bromopropane

- The H_b signal is split into 12 peaks, a quartet of triplets. The number of peaks actually seen for the signal depends on the relative size of the coupling constants, J_{ab} and J_{bc} . When $J_{ab} \gg J_{bc}$, as drawn in this diagram, all 12 lines of the pattern are visible. When J_{ab} and J_{bc} are similar in magnitude, peaks overlap and fewer lines are observed.

4) To which end of an alkene does the hydrogen add in hydrohalogenation without a radical initiator?

The hydrogen adds to the least substituted end of the double bond so that the most stable carbocation is formed.

5) What is another name for the 1,4-addition product?

Conjugate addition product