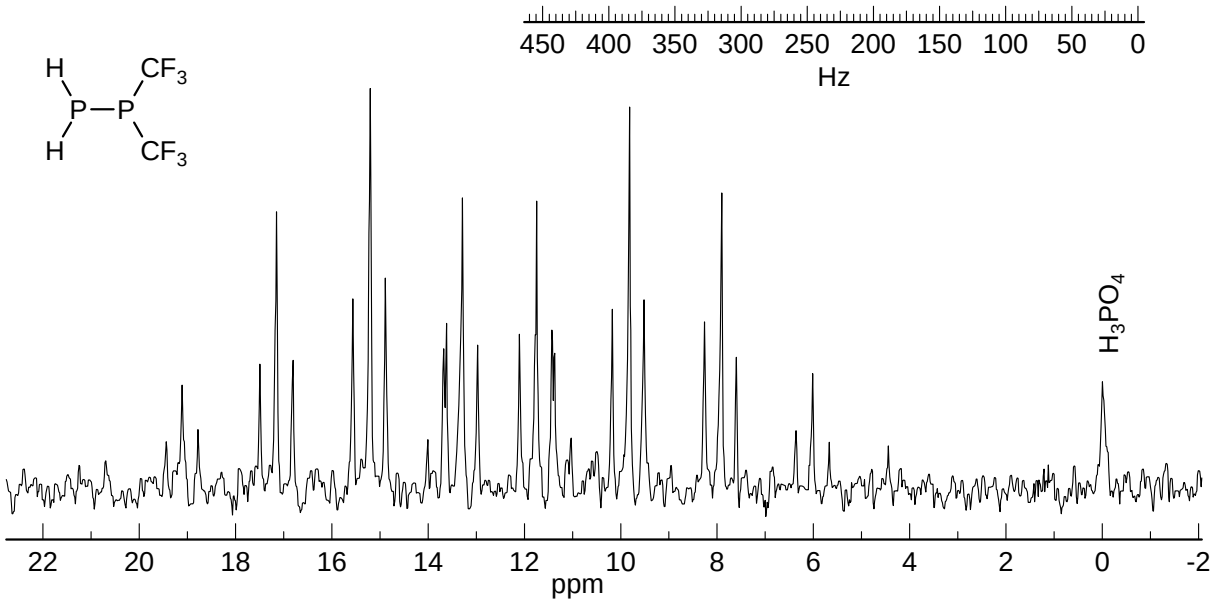
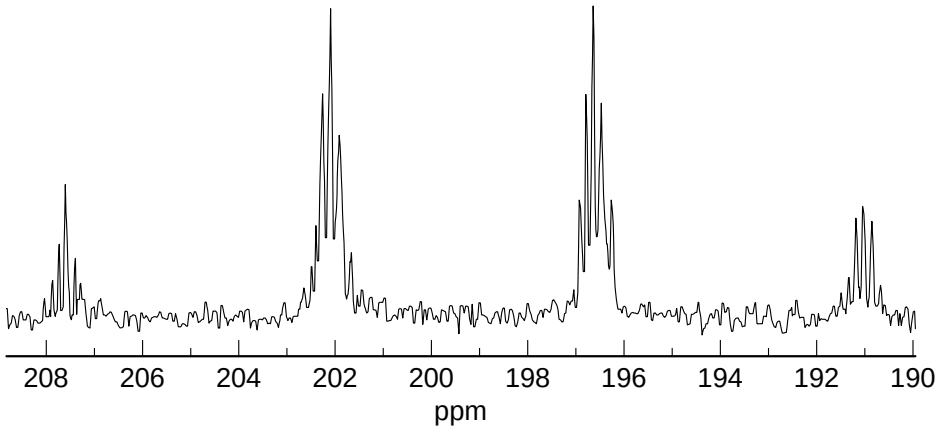
**Problem R-06M** ($C_2H_2F_6P_2$)

36.4 MHz $^{31}P$ NMR spectrum. The spectrum is NOT proton decoupled.

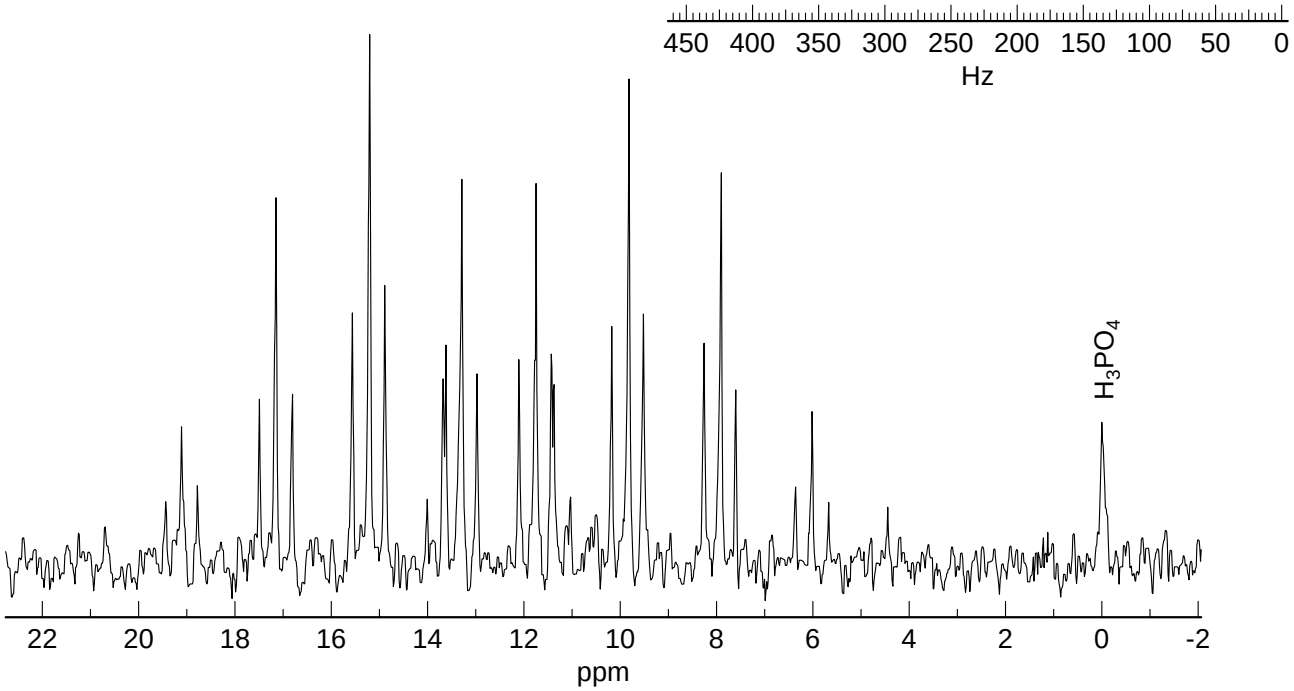
Source: R. Demuth, J. Grobe *J. Fluorine Chem.* **1972/73**, *2*, 269. (Reich digitized hard copy) g




PLT ex-3-2006-07-gq.plt

**Problem R-06M** One of the phosphorus signals of $(CF_3)_2P\text{-}PH_2$ is shown below. The spectrum is NOT proton decoupled. Source: R. Demuth, J. Grobe *J. Fluorine Chem.* **1972/73**, *2*, 269.




(a) Which P signal is it? Explain briefly.

(b) Identify couplings and report then in the standard format ($^nJ_{HH}$ = 00 Hz)

PLT ex-3-2006-07-gq.plt

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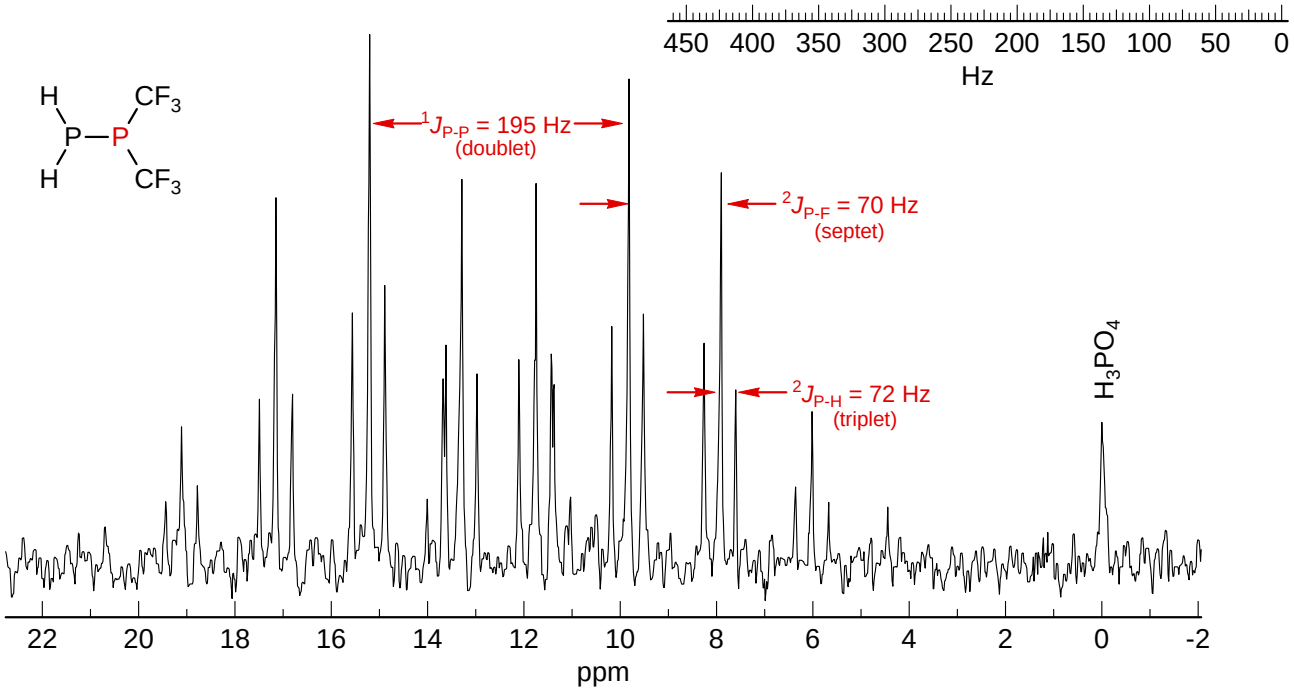
**Problem R-06M** One of the phosphorus signals of $(CF_3)_2P\text{-}PH_2$ is shown below. The spectrum is NOT proton decoupled. Source: R. Demuth, J. Grobe *J. Fluorine Chem.* **1972/73**, *2*, 269.




(a) Which P signal is it? Explain briefly.

5 This is the $P(CF_3)_2$ signal. If it was the $PH_2$ signal would expect a triplet of doublets (or even a quartet) with large couplings to H and P (150-200 Hz). As it is, the triplet splitting is only about 12 Hz

(b) Identify couplings and report then in the standard format ($^nJ_{HH}$ = 00 Hz)

This is a doublet of septets of triplets due to coupling of P to P, $F_6$ and $H_2$

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$^1J_{P\text{-}P}$ = 195 Hz

$^2J_{P\text{-}F}$ = 70 Hz

$^2J_{P\text{-}H}$ = 12 Hz

*J. Fluorine Chem*. **1972/73**, *2*, 276

$^1J_{PH}$ = 202 Hz

$^2J_{PPH}$ = 12.3 Hz

$^2J_{FCP}$ = 70.0 Hz

$^1J_{PP}$ = 195 Hz

$\delta_H$ = 3.03

$\delta_F$ = 52.2 (sign?)

$\delta_{PCF3}$ = 12.5

$\delta_{PH2}$ = 199

PLT ex-3-2006-07-gq.plt