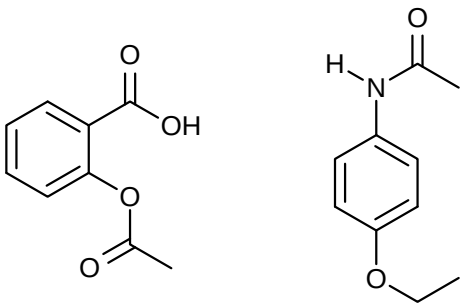
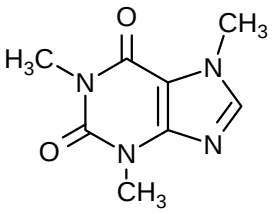
Problem R-09F. This is the 60 MHz ^{1}H NMR spectrum of a commercial pain-killer APC, which a mixture of aspirin, phenacetin, and caffeine (from James M. Schoolery "A Basic Guide to NMR").

(a) Identify as many of the signals of each compound as you can, labelling the spectrum with A, P or C.



Aspirin
$C_9H_8O_4$

Phenacetin
$C_{10}H_{13}NO_2$



Caffeine
$C_8H_{10}N_4O_2$

(b) Determine the molar ratios of the three substances.

Aspirin:____% Phenacetin:____% Caffeine:____%

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8 **Problem R-09F**. This is the 60 MHz ^{1}H NMR spectrum of a commercial pain-killer APC, which a mixture of aspirin, phenacetin, and caffeine (from James M. Schoolery "A Basic Guide to NMR").

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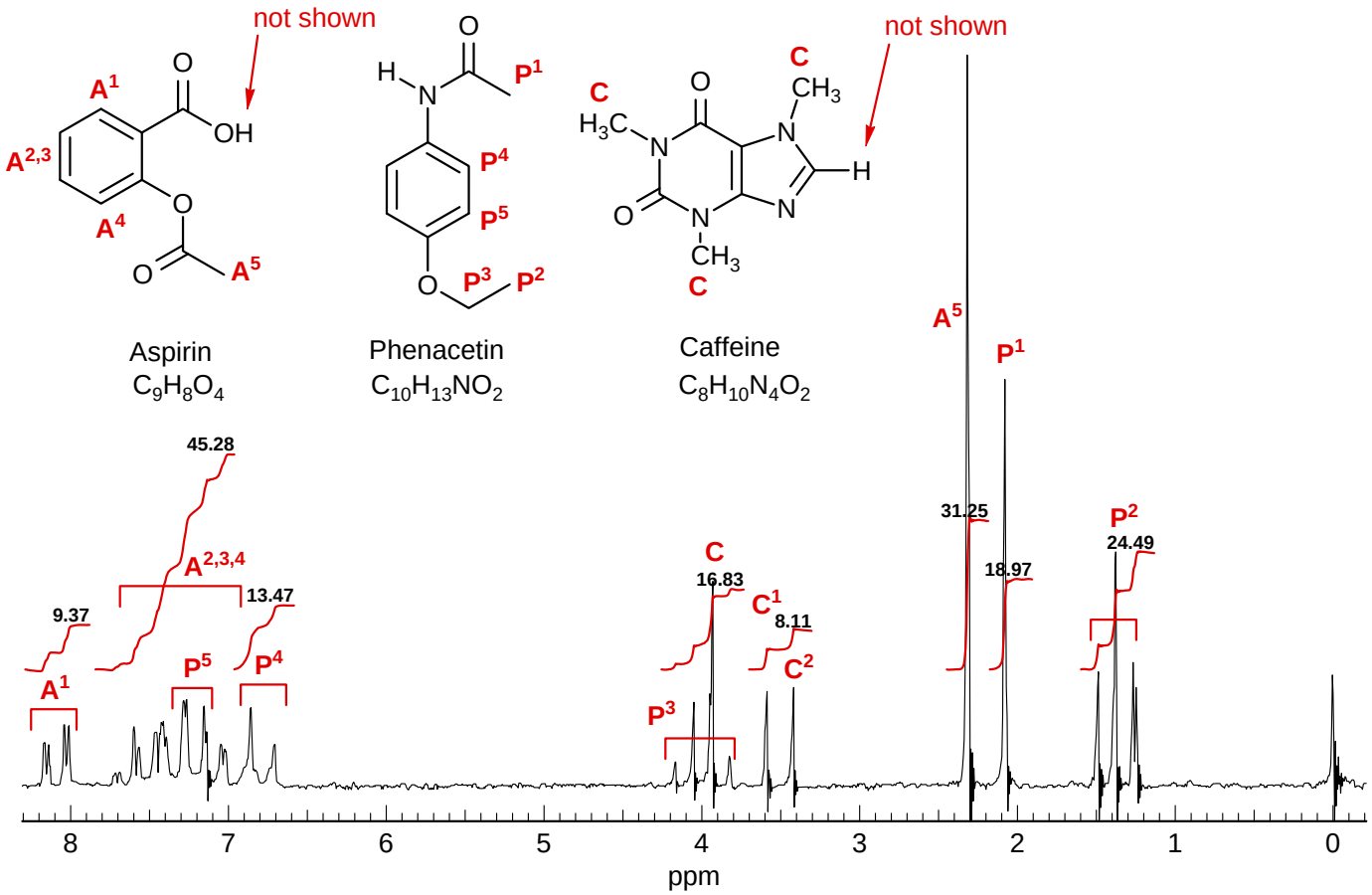

(b) Determine the molar ratios of the three substances.

Aspirin: 9.9 % Phenacetin: 6.4 % Caffeine: 1.3 %

A^1 9.4/1 = 9.4
A^5 31.3/3 = 10.4

P^1 19.0/3 = 6.3
P^2 24.5/3 = 6.2
P^4 13.5/2 = 6.7

$C^{1,2}$ 8.11/6 = 1.3