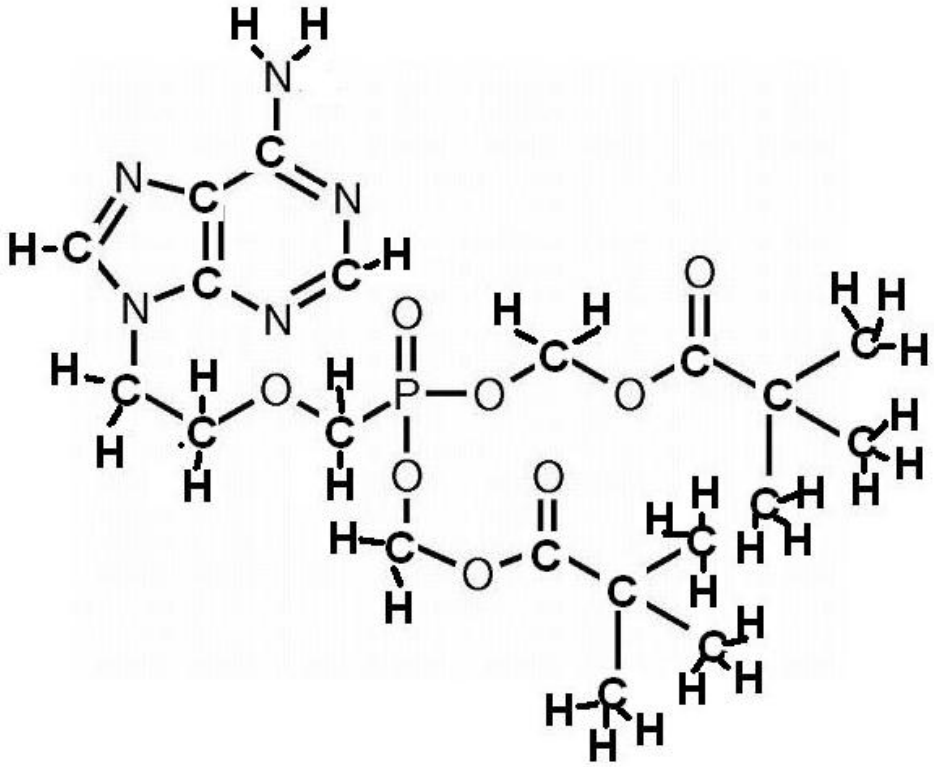

This is a figure showing the locations of hydrogen (H), oxygen (O), carbon (C) , nitrogen (N) and phosphorus (P) atoms in one molecule of adefovir dipivoxil, which is a drug designed to treat hepatitis B.

Problem 1 - How many atoms of each element are present in one molecule of tannic acid?

Problem 2 - Write the molecular formula of this molecule by filling-in the blanks with the number of counted atoms in the following:

C__ H__ N__O__P__

Problem 3 – The mass of each element is given in terms of Atomic Mass Units (AMUs). If the masses of the atoms in adefovir dipivoxil are H = 1 AMU, C=12 AMU, N= 14 AMU, O=16 AMU, and P = 31 AMU, what is the total mass of a single molecule in AMUs?

Problem 4 - If 1 AMU equals 1.7 x 10^{-27} kilograms, how many molecules are present in a sample with a mass of 1 microgram?

Problem 1 - How many atoms of each element are present in one molecule of tannic acid?

Answer: **Carbon (C) = 20**
Oxygen (O) = 8
Hydrogen (H) = 32
Nitrogen (N) = 5
Phosporus (P) = 1

Problem 2 - Write the molecular formula of this molecule by filling-in the blanks with the number of counted atoms in the following:

$$C_{20}\ H_{32}\ N_5\ O_8\ P$$

Problem 3 – The mass of each element is given in terms of Atomic Mass Units (AMUs). If the masses of the atoms in adefovir dipivoxil are H = 1 AMU, C=12 AMU, N= 14 AMU, O=16 AMU, and P = 31 AMU, what is the total mass of a single molecule in AMUs?

Answer: M = 20(12) + 32(1) + 5(14) + 8(16) + 1(31) = **501 AMU.**

Problem 4 - If 1 AMU equals 1.7×10^{-27} kilograms, how many molecules are present in a sample with a mass of 1 microgram?

Answer: One molecule has a mass of 501 AMU x (1.7×10^{-27} km/1 AMU) = 8.5×10^{-25} kg. The sample has a total mass of 1.0×10^{-6} grams which equals 1.0×10^{-9} kilograms.

So the number of molecules is N = 1.0×10^{-9} /8.5×10^{-25} = **1.2×10^{15} molecules**.