Quiz 4A

1. For centuries, the Australian aborigines have used the leaves of the eucalyptus tree to alleviate sore throats and other pains. The primary active ingredient has been identified and named eucalyptol (14 points).
	1. The analysis of a sample of eucalyptol of total mass 3.16 g gave its composition as 2.46 g carbon, 0.373 g hydrogen and 0.329 g oxygen. What is the empirical and molecular formula?

$$2.46 g C×\frac{1 mol C}{12.01 g C}=\frac{0.204829309 mol C}{0.0205625 mol}=9.961303791≈10$$

$$0.373 g H×\frac{1 mol H}{1.008 g H}=\frac{0.370039683 mol H}{0.0205625 mol}=17.99585084≈18$$

$$0.329 g O×\frac{1 mol O}{16.00 g O}=\frac{0.0205625 mol O}{0.0205625 mol}=1$$

The empirical and molecular formula is C10H18O

* 1. What is the molar mass of eucalyptol? Use C12H23O6 if you do not get an answer for part a (not the correct formula).

C: (10)(12.01 g/mol) = 120.1 g/mol

H: (18)(1.008 g/mol) = 18.144 g/mol

O: (1)(16.00 g/mol) = 16.00 g/mol

 154.244 g/mol ≈ 154.2 g/mol

For C12H23O6 the molar mass is 263.3 g/mol

* 1. What is the percent carbon? Again use C12H23O6 if you did not get an answer for part a (not the correct formula).

$$\%C=\frac{120.1 g/mol}{154.2 g/mol}×100=77.88586252\%≈77.89\% C$$

For C12H23O6, %C = 54.74% C.

1. The arsenate ion is AsO43-. Name the following compounds (6 points):
	1. Mg3(AsO4)2 magnesium arsenate
	2. CrAsO3 chromium(III) arsenite
	3. H3AsO4 (aq) arsenic acid
2. What piece of glassware is used for measuring a volume of a liquid? Circle the correct answer (2 points).

Beaker or graduated cylinder or an Erlenmeyer flask

Quiz 4B

1. The tellurate ion is TeO42-. Name the following compounds (6 points):
	1. H2TeO3 (aq) tellurous acid
	2. Co2(TeO4)3 cobalt(III) tellurate
	3. CaTeO4 calcium tellurate
2. What piece of glassware is used for transferring a liquid? Circle the correct answer (2 points).

Beaker or graduated cylinder or an Erlenmeyer flask

1. Thionyl fluoride is a colorless gas of mainly theoretical interest. It is toxic and can cause pulmonary edema or oedema, which is a fluid accumulation in the air spaces and parenchyma of the lungs, at high concentrations.
	1. The analysis of thionyl fluoride shows a mass composition of 18.59 % oxygen, 37.25% sulfur and 44.16% fluorine. What are the molecular and empirical formulas?

$$18.59 g O×\frac{1 mol O}{16.00 g O}=\frac{1.161875 mol O}{1.161521671 mol}=1.000304195≈1$$

$$37.25 g S×\frac{1 mol S}{32.07 g S}=\frac{1.161521671 mol S}{1.161521671 mol}=1$$

$$44.16 g F×\frac{1 mol F}{19.00 g F}=\frac{2.324210526 mol F}{1.161521671 mol}=2.001004875≈2$$

The molecular and empirical for thionyl fluoride is OSF2.

* 1. What is the molar mass of thionyl fluoride? Use O2SF4 (not the correct answer), if you did not get an answer for part a.

O: (1)(16.00 g/mol) = 16.00 g/mol

S: (1)(32.07 g/mol) = 32.07 g/mol

F: (2)(19.00 g/mol) = 38.00 g/mol

 86.07 g/mol

For O2SF4, the molar mass is 140.07 g/mol.

* 1. What is the percent fluorine? Again use O2SF4 (not the correct answer), if you did not get an answer for part a.

$$\%F=\frac{38.00 g/mol}{86.07 g/mol}×100=44.15011038\%≈44.15\% F$$

For O2SF4, %F = 54.26%.