WS 7.5

WS ~~3.4~~ Empirical Formulas *Name:*_____ *p.*____

1. Determine the percent composition (by mass) of each element in $Cr(NO_3)_3$

$51.996 + 3(14.0067) + 9(15.9994) = 238.0107$ g/mole or amu

$\%\ Cr = \frac{51.996\ amu}{238.0107\ amu} \times 100 =$ **21.846 % Cr**

$\%\ N = \frac{3(14.0067)\ amu}{238.0107\ amu} \times 100 =$ **17.6547 % N**

$\%\ O =$ _____ =

2. What is the **empirical formula** of each of these compounds?

Molecular formula:	$C_6H_{10}O_4$	$C_5H_{10}O_5$	CH_4O	$C_9H_{18}O_6$	C_8H_{12}
Empirical formula:	_____	_____	_____	_____	_____

3. A compound is 21.8% Chromium, 17.7% Nitrogen, and 60.5% oxygen, by mass. Determine the empirical formula of the compound.

4. A compound is 66.6% carbon, 11.2% hydrogen, and 22.2% oxygen, by mass. Determine the empirical formula.

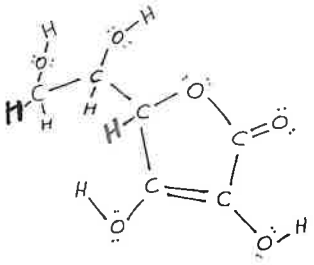
5. For each compound, use the picture to find the molecular formula, and then find the empirical formula. Note: All of the compounds below are organic; they contain carbon. In organic compounds, the formula is usually written in the following order: $C_wH_xN_yO_z$.

ascorbic acid
(Vitamin C)
molecular formula

_____

empirical formula

_____



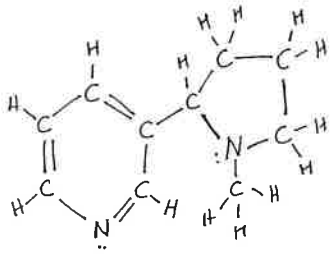
Nicotine

molecular formula

_____

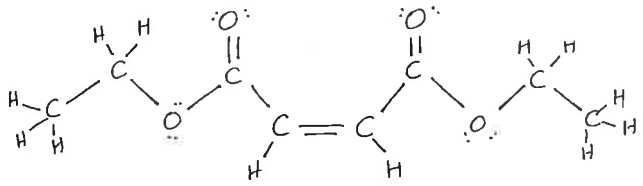
empirical formula

_____



diethyl maleate
(used in making plastics)
molecular_____

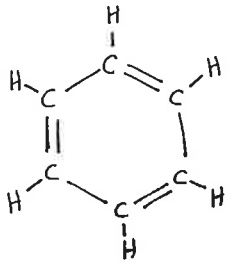
empirical _____



benzene

molecular_____

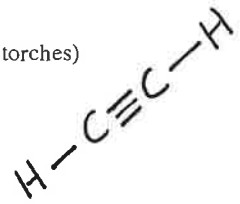
empirical_____



acetylene / ethyne (used in welding torches)

molecular_____

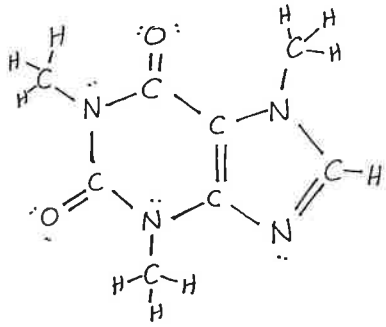
empirical_____



Caffeine

molecular_____

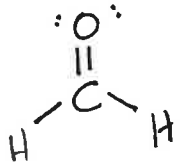
empirical_____



formaldehyde
(a carcinogen. used in embalming)

molecular_____

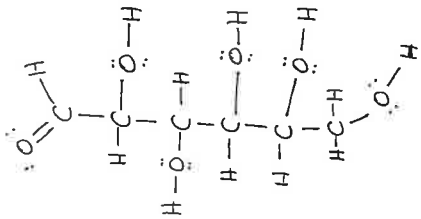
Empirical_____



glucose
("blood sugar")

molecular_____

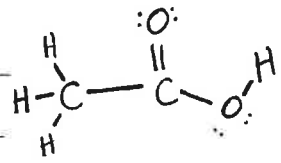
empirical_____



acetic acid/ethanoic acid
(in vinegar)

molecular_____

empirical_____



6. A compound is 42.1% sodium 18.9% phosphorus, and 39.0% oxygen, by mass. Determine the empirical formula of the compound.