CHM 1020-01 **QUIZ 1** **January 15, 1999**

This quiz is take-home and open book, and it is intended that all members of the group contribute to completing it. It is a violation of the Academic Honor Code to sign a quiz that you did not work on. **The quiz is due at the end of class on Thursday, January 21.**

List names in alphabetical order, and give social security numbers! Put names on all pages, and stapel pages together

_____ _____

_____ _____

_____ _____

Points

(3.2) 1. The permissible limits for the major air pollutants are expressed in **ppm**, which stands for **parts per million.** This is parts per million by volume, not by mass, which in turn means parts per million by numbers of particles (atoms or molecules), a result of **Avogadro's hypothesis**, which states that "equal volumes of gas at the same temperature and pressure contain equal numbers of particles." For the standards listed below, express the numbers in (a) percent by volume, and (b) the number of particles in one liter of gas which, at atmospheric pressure and 25 ^{o}C, contains 2.69 x 10^{22} particles. **Express your answer to the appropriate number of significant figures**.

Permissible limits expressed in:	Carbon monoxide	Ozone	Sulfur oxides	Nitrogen oxides
ppm	**9**	**0.12**	**0.030**	**0.053**
percent volume	_____	_____	_____	_____
particles in one liter	_____	_____	_____	_____

(4) 2. Complete the following table by giving the name of the element, classifying it as a **metal** or **non-metal**, and its physical state at room temperature and atmospheric pressure. (You may have to consult the web site or another book for this last piece of information).

Symbol	**Name**	**Class**	**Physical State**
Hg	_____	_____	_____
He	_____	_____	_____
K	_____	_____	_____
F	_____	_____	_____
Cu	_____	_____	_____

List names in alphabetical order**.** **Be sure to staple pages together!**

(0.9) 3. Binary compounds between alkali or alkaline earth metals and elements of group 6A or 7A usually have only one formula and do not therefore require the use of prefixes for naming. Give the name of the following compounds:

(a) NaBr (b) $MgCl_2$ (c) CaO

(0.9) 4. Binary compounds of non metals often can combine in more than one ratio, so prefixes are necessary to specify the relative numbers of atoms in a molecule. The prefix **mono** is often omitted when referring to the first atom of the formula. Give the name of the following compounds:

(a) SO_2 (b) PCl_5 (c) N_2O_5

(6) 5. Your backyard grill uses **propane** gas as a fuel. The molecular formula for propane is $\mathbf{C_3H_8}$**.** Propane is stored under pressure, in which case it is a liquid, but becomes a gas which enters the burner and is burned. The combustion is usually incomplete, as you might tell when you get sooty carbon deposits on the lid of your grill. We can express several **idealized** reactions, however, in proper chemical terms. Write a balanced chemical equation for each of the following idealized reactions:

(a) Complete combustion of $\mathbf{C_3H_8}$ to form $\mathbf{CO_2}$ and $\mathbf{H_2O}$.

(b) Partial combustion of $\mathbf{C_3H_8}$ to form **CO** and $\mathbf{H_2O}$.

(c) Partial combustion of $\mathbf{C_3H_8}$ to form **C** and $\mathbf{H_2O}$.