Chemistry 112 First Hour Exam

Name:		
	(4 points)	

Please show all work for partial credit

All problems worth 12 points

1 . How many significant figures should you have in the answer for each of the following calculations?

D.
$$(23.56 \times 2060) + (23.56 \times 2060)$$

- 2. Calculate the following unit conversions:
 - A. Convert 31miles to centimeters

$$31 \ mi \times \frac{1 \ km}{.62137 \ mi} \times \frac{1000 \ m}{1 \ kn} \times \frac{1 \ cm}{.01 \ m} = 4.99 \times 10^6 \ cm$$

B. Convert 6.37Mm³ to cm³

$$6.37~Mm^{3} \times \frac{1 \times 10^{6}~m}{1~Mm} \times \frac{1 \times 10^{6}~m}{1~Mm} \times \frac{1 \times 10^{6}~m}{1~Mm} \times \frac{1~cm}{.01~m} \times \frac{1~cm}{.01~m} \times \frac{1~cm}{.01~m} = 6.37 \times 10^{24}~cm^{3}$$

C. Convert 5 Joules (a unit of energy) to units of lbs·in²/s²

$$5 j \times \frac{1 kg \cdot m^2 / s^2}{1j} = 5 \frac{kg \cdot m^2}{s^2};$$

$$5 \frac{kg \cdot m^2}{s^2} \times \frac{2.2046 \ lbs}{1 \ kg} \times \frac{39.37 \ in}{1 \ m} \times \frac{39.37 \ in}{1 \ m} = 1.71 \times 10^4 \ lbs \cdot in^2 / s^2$$

3. A. An atom contains 6 electrons, 6 protons and 6 neutrons. Name this atom or ion.
C or Carbon
B. An atom contains 36 electrons, 37 protons and 48 neutrons. Name this atom or ion.
Rb ⁺
C. An atom contains 36 electrons, 35 protons and 45 neutrons. Name this atom or ion.
Br
4A. The halogen in the third period of the periodic table is:Cl It is a metal or a nonmetal?
B. The alkaline earth metal in the fourth period of the periodic table is:Ca It is a metal or a nonmetal?
C. The Noble gas in the first period of the periodic table is:He It is a metal or a nonmetal?
5. Name the following compounds:
CsF Cesium Fluoride
Mg(NO ₂) ₂ Magnesium nitrite
O ₂ F ₂ Dioxygen difluoride
HC ₂ H ₃ O ₂ Acetic Acid
6. Give the correct molecular formulas for the following compounds:
Aluminum fluoride AIF ₃
Chromium(IV) oxide CrO ₂
Sulfur tetrafluoride SF ₄
Hydrobromic acid HBr(aq)
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7. Define the following terms:

Heterogeneous mixture

A mixture of two or more things in which individual components can be discerned by eye.

Pure substance

A substance that contains only one element or compound.

compound

A material that is composed of two or more different elements that are bonded together to they cannot be separated by physical means.

Atomic mass

What I really wanted was mass number, the number of protons and neutrons in a nucleus. Atomic mass probably be better defined as the average mass, in grams, of 1 mole of an element. If you gave this definition, and I took points off, tell me so I can correct my error.

Electron

A nearly massless elementary particle that has a negative charge and 'orbits' around the nucleus of an atom in some way.

Precision

How measure of how close a set of measurements are to each other, but not how close they are to the true value.

8. The classroom you are taking this test in is 48 ft x 57 ft x 8 ft. The density of air is 1.19 g / L. How many kilograms of air are in this room? [1 L = $(10cm)^3$]

Volume of room in $ft^3 = 48x57x8 = 21888ft^3$

Volume of room in cm³:

$$21888 \ ft^3 \times \frac{12 \ in}{1 \ ft} \times \frac{12 \ in}{1 \ ft} \times \frac{12 \ in}{1 \ ft} \times \frac{2.54 \ cm}{1 \ in} \times \frac{2.54 \ cm}{1 \ in} \times \frac{2.54 \ cm}{1 \ in} = 6.2 \times 10^8 \ cm^3$$

$$1L = (10cm)^3 = 1000 cm^3$$

Volume of room in L = $6.2x10^8$ cm³ x (1L/1000cm³) = $6.2x10^5$ L

Density = Mass/volume $1.19g/L = X \text{ grams}/6.2x10^5 \text{ L}; X = 1.19g/L \times 6.2x10^5 \text{ L} = 7.38x10^5 \text{ g}$

Converting to kg

 $7.38 \times 10^{5} \text{g X (1 Kg/1000g)} = 738 \text{ kg.}$