CHEMISTRY 2202
Unit I Section 1 Homework Portfolio
2005 – 2006

INSTRUCTIONS: Save the scanned file as: HWPu1s1_*name.pdf (or .tif).* Show all calculations.

(Total Value: 2 marks)

Value

(4) 1. Copy and complete this table.

Isotope Notation	Isotope Name	Atomic Number	Mass Number	Number of Protons	Number of Neutrons	Number of Electrons
		38	87			38
	Thorium-230					
$^{99}_{43}Tc$						
		82	208			

(2) 2. One common type of smoke detector contains a small amount of radioactive americium-241. When smoke enters the detector the radiation inside the detector ionizes the smoke. The ionized smoke then conducts electricity and the alarm buzzes.

a) Write americium-241 in isotope notation?
b) How many neutrons does this isotope have?

(4) 3. Calculate the molar mass of each substance.

(a) methanol
(b) nitrogen gas
(c) nickel (III) bromide
(e) calcium chloride hexahydrate

(6) 3. Calculate the mass of each given amount.

(a) 2.50 mol of methane, CH_4
(b) 0.500 mol of sodium silcate, Na_2SiO_3
(c) 0.250 mol of copper(II) nitrate dihydrate, $Cu(NO_3)_2 \bullet 2\ H_2O$

(6) 4. Calculate the number of moles in each sample.

(a) 100.0 g of gold metal, Au
(b) 50.0 g of silicon dioxide (sand), SiO_2
(c) 1.50 kg of potassium nitrate KNO_3

(2) 5. Calculate the volume of each gas at STP.

(a) 5.00 mol of oxygen gas
(b) 1.25 kmol of carbon monoxide

(2) 6. Calculate the number of moles of each gas at STP conditions.

(a) 50.0 L of butane, C_4H_{10}
(b) 200.0 kL of ozone, O_3

(2) 7. Calculate the number of molecules in each sample.

(a) 0.125 mol of hydrogen
(b) 0.250 kmol of carbon dioxide

(2) 8. Calculate the number of moles in each sample.

(a) 7.50×10^{24} formula units of potassium chloride
(b) 1.25×10^{22} atoms of barium

(4) 9. Perform these conversions:

(a) 25.0 g of strontium fluoride to number of formula units.
(b) 250 L of methane, CH_4 at STP to a mass amount.

(3) 10. Calculate the percentage composition of the elements in benzene, C_6H_6 .

(4) 11. The fermentation of apples produces apple cider. Upon chemical analysis of the cider a chemical compound is isolated and is found to be composed of 52.14% carbon (C), 13.13% hydrogen (H) and 34.73% oxygen (O). Based on this information, what is the empirical formula of this compound?

(4) 12. A white powder is analyzed and found to contain 43.64% phosphorus and 56.36% oxygen by mass and had a molar mass of 283.88 g/mol. What are the compound's empirical and molecular formulas?