Name: _____

Instructor: Mills

Chemistry 101: 2nd Midterm Examination Practice Questions

(see the class notes for answers to these questions)

Answer all four questions. Each question is worth 25 points. Please ensure you have all *five* pages of questions, as well as a formula sheet and periodic table *before* starting work. Only attempt the extra credit question after you have completed the four assigned problems. For numerical answers, include the correct number of **significant figures** and appropriate **S.I. unit(s)**. For full credit you must….

SHOW ALL WORK

Question	Score
1	
2	
3	
4	
Extra Credit	
Total	

"Take out?"

Question 1: Monosodium glutamate (MSG) is a popular flavor enhancer used in many fast foods. Assuming MSG contains 35.51% C, 4.77% H, 37.85% O, 8.29% N, and 13.6% Na, and has a molar mass of 169 g/mol determine:

The Empirical formula of MSG

The Molecular formula of MSG

"Equations and Solubility"

Question 2: Write *balanced*, *complete* and *net ionic* equations illustrating the reaction between aqueous solutions of silver nitrate and sodium phosphate. *Include all state symbols*.

Balanced chemical equation:

Complete ionic equation:

Net ionic equation:

List the names and formulas of five insoluble ionic compounds containing the hydroxide ion.

"Limiting"

Question 3: Lithium and nitrogen react to produce lithium nitride:

$$6\ Li(s) + N_2\ (g) \rightarrow 2\ Li_3N\ (s)$$

If 7.00 grams of each reactant undergo a reaction with 85.0 % yield, how many grams of Li_3N are obtained from the reaction?

"Lewis symbols and Dot structures"

Question 4: Draw Lewis symbols and complete 'dot' structures and for the following:

	Lewis symbol	**Dot structure**
Carbon atom		
Oxide anion		
Sodium atom		
Hydrogen atom		
Magnesium ion		

Extra Credit

Expect a descriptive style question taken from the reading.

Data sheet

Density = mass/volume
Density copper (Cu) = 8.95 gcm^{-3}
1 a.m.u. = 1.6606 x 10^{-24} g
Volume cylinder = $\pi r^2 h$

1 kg = 2.205 lb
1 inch = 2.54 cm
1 ft = 12 inches (exactly)
$1dm^3 = 1L = 10^{-3} m^3$

1 cm^3 = 1 mL = 1 x10^{-6} m^3
1 mile = 1.6039 km
1 gallon = 3.786 L

Common Decimal Prefixes

Prefix	Symbol	Exponential Notation
Giga	G	10^9
Mega	M	10^6
Kilo	k	10^3
deci	d	10^{-1}
centi	c	10^{-2}
milli	m	10^{-3}
micro	μ	10^{-6}
nano	n	10^{-9}

Solubility rules:

Soluble Compounds		Exceptions
Compounds containing	NO_3^-	None
	Cl^-	Ag^+, Hg^{2+},Pb^{2+}
	Br^-	Ag^+, Hg^{2+},Pb^{2+}
	I^-	Ag^+, Hg^{2+},Pb^{2+}
	SO_4^{2-}	Ba^{2+}, Hg^{2+},Pb^{2+}

Insoluble Compounds		Exceptions
Compounds containing	CO_3^{2-}	NH_4^+ & group IA cations
	PO_4^{3-}	NH_4^+ & group IA cations
	OH^-	group IA cations Ca^{2+},Sr^{2+}, Ba^{2+} & NH_4^+