Chemistry Honors—Fall Final Review

Part I: Chemistry Content (30 points)
60 multiple choice questions on physical and chemical properties, significant figures, metric conversions, scientific measurement, atomic models, atomic structure, chemical nomenclature, chemical quantities, chemical reactions, and chemical equations
These will be similar to the multiple choice questions on chapter tests and quizzes

Part II: Science Comprehension (15 points)
Several paragraphs about a chemical element and series of short answer questions about the element

Part III: The Periodic Table (10 points)
A data table to complete with information about atomic number, atomic mass, and numbers of protons, electrons, and neutrons in selected elements

Part IV: Graphing (15 points)
A data table with chemical information about elements or compounds and instructions for constructing a graph and performing calculations about the information

Part V: Chemistry Problem Solving (20 Points)
Ten chemistry problems to solve involving metric conversions, atomic and molar mass, percent composition, moles, Avogadro's number, and Avogadro's number

Part VI: Equations (10 Points)
Five chemical reactions to identify and balance

Terms to know

atom
proton
electron
neutron
nucleus
mass
weight
gas
liquid
solid
physical property
chemical property
physical change
chemical change
significant figures
metric conversions
precipitate
accuracy
precision
percent error

grams
liters
meters
density
volume
temperature
Celsius
Kelvin
Democritus
Dalton
Thomson
Rutherford
cathode ray tube
gold foil experiment
atomic number
atomic mass
mass number
formula mass
molar mass

period
family
ion
ion charges
ionic compound
polyatomic ions
acetic acid
hydrochloric acid
nitric acid
carbonic acid
sulfuric acid
phosphoric acid
covalent compound
percent composition
element names
element symbols
toxicity
chemical reaction
reactant
product

alkali metals
alkaline earth metals
transition metals
rare earth metals
halogens
noble gases
diatomic
H_2
O_2
N_2
Cl_2
Br_2
I_2
F_2

synthesis
decomposition
single replacement
double displacement
combustion

The Periodic Table

Element	Symbol	Atomic #	Atomic Mass	Mass #	Protons	Electrons	Neutrons
arsenic							
argon							
antimony							
aluminum							

Chemistry Problem Solving

1. Convert 275 mg potassium to g.
2. Convert 2.45×10^3 mg potassium chlorate to g.
3. Convert 125 g potassium nitrate to ng.
4. What is the formula mass of potassium chloride?
5. Calculate the number of grams in 1.75 moles of potassium chloride.
6. Calculate the number of moles in 500.0 g KNO_3
7. Calculate the number of moles in 85.5 g potassium permanganate.
8. Calculate the percent potassium in potassium hydroxide.
9. Determine the mass of a cube of potassium that measures 2.0 cm on each side. (The density of potassium is 0.86 g/cm^3).
10. Determine the number of molecules in 0.500 moles of KCr_2O_7

Chemical Equations

_____ 1. __ $NaOH$ + __ H_2SO_4 → __ Na_2SO_4 + __ H_2O

_____ 2. __ Na + __ H_2O → __ $NaOH$ + __ H_2

_____ 3. __$KMnO_4$ + __ $Ni(NO_3)_2$ → __ KNO_3 + __ $Ni(MnO_4)_2$

_____ 4. __$NaClO_3$ → ___ $NaCl$ + ___ O_2

_____ 5. __P + __ O_2 → __P_2O_5

_____ 6. __C_4H_{10} + __ O_2 → ___ CO_2 + __ H_2O

_____ 7. __ CaO + __ $NaCl$ → __ Na_2O + __ $CaCl_2$

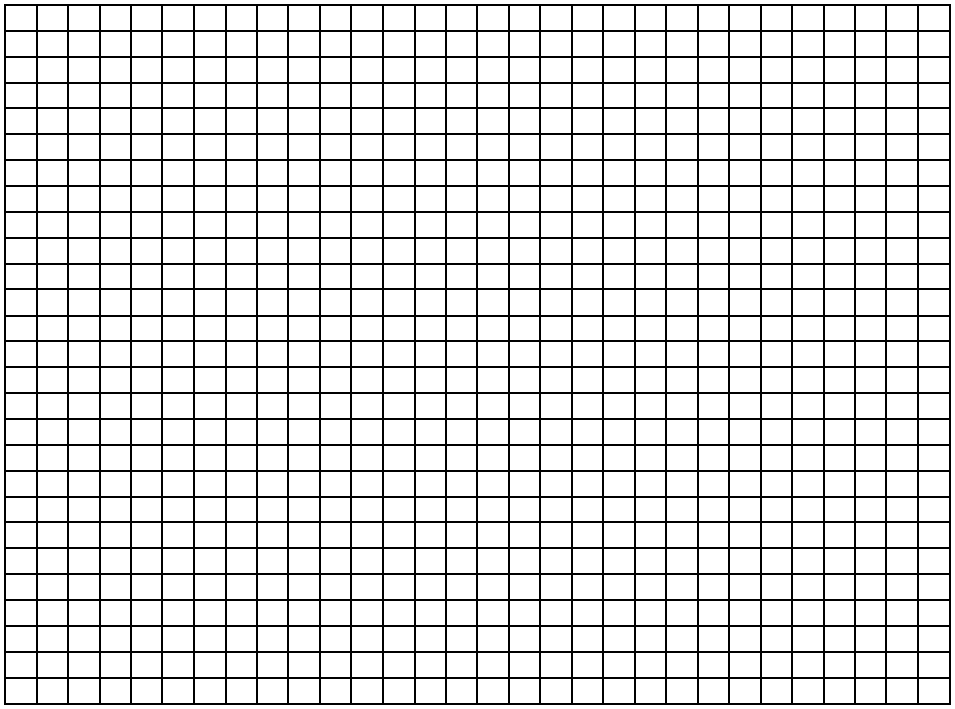
_____ 8. __Al + __ $CuSO_4$ → __$Al_2(SO_4)_3$ + __ Cu

Graphing

a. Graph the following data on mass and volume of various solids
b. Write the correct formula for the liquids on the line provided
c. Graph mass vs volume
d. Determine the density from the slope (remember units)

Volume (cm^3)	Mass of Solid (g)				
	Antimony _____	Aluminum _____	Arsenic _____	Selenium _____	Silver _____
5	33.00 g	13.00 g	29.00 g	24.00 g	52.00
10	66.00 g	28.00 g	58.00 g	49.00 g	106.00
15	100.00 g	41.00 g	84.00 g	75.00 g	160.00
20	135.00 g	53.00 g	115.00 g	95.00 g	212.00
25	170.00 g	68.00 g	145.00 g	120.00 g	253.00
Density	_____	_____	_____	_____	_____

_____



Mercury Health Hazards
http://www.nih.gov/od/ors/ds/nomercury/health.htm

1. Identify 3 physical properties
2. Identify 2 chemical properties
3. Name 4 mercury compounds
4. Name 2 sources of mercury toxicity
5. Describe 2 symptoms of mercury toxicity
6. Identify 2 ways to prevent mercury toxicity

Toxicology: How Mercury Harms Humans

Elemental (metallic) mercury and its compounds are toxic and exposure to excessive levels can permanently damage or fatally injure the brain and kidneys. Elemental mercury can also be absorbed through the skin and cause allergic reactions. Ingestion of inorganic mercury compounds can cause severe renal and gastrointestinal toxicity. Organic compounds of mercury such as methyl mercury are considered the most toxic forms of the element. Exposures to very small amounts of these compounds can result in devastating neurological damage and death. For fetuses, infants and children, the primary health effects of mercury are on neurological development. Even low levels of mercury exposure such as result from mother's consumption methyl mercury in dietary sources can adversely affect the brain and nervous system. Impacts on memory, attention, language, and other skills have been found in children exposed to moderate levels in the womb.

How Do People Get Exposed To Mercury?

Air borne mercury is highly toxic when inhaled. How does it get in the air? Metallic mercury slowly evaporates when exposed to the air. The air in a room can reach contamination levels just from the mercury in a broken thermometer

Mercury may be released into the air when coal, oil, or wood are burned as fuel or when mercury-containing wastes are incinerated. The resulting mercury concentrations in outdoor air are usually low and of little direct concern. However, mercury in the air can fall to the ground with rain and snow, landing on soil or in bodies of water, causing contamination. Lakes and rivers are also contaminated when there is a direct discharge of mercury-laden industrial or municipal waste into the water.

When mercury enters bodies of water, biological processes transform it to methyl mercury, a highly toxic and bioaccumulative form. Fish can absorb methyl mercury from their food and directly from water as it passes over their gills.

The cycle of mercury in nature is complex.

1. Methyl mercury in the water and sediment is taken up by tiny animals and plants known as plankton.
2. Minnows and juvenile fish eat large quantities of plankton over time.
3. Larger predatory fish consume many smaller fish, accumulating methyl mercury in their tissues. The older and larger the fish, the greater the potential for high mercury levels in their bodies.
4. Fish are caught and eaten by humans and animals, causing methyl mercury to accumulate in human tissues.

Most people are exposed to mercury by eating fish containing mercury. Since mercury is tightly bound to proteins in all fish tissue, including muscle, there is no method of cooking or cleaning them that will reduce the amount of mercury in a meal.

From the mid-1950s to the 1970s, several mass poisonings took place in Japan and in Canada involving methyl mercury from consumption of fish from contaminated waters. Although instances of poisoning from fish consumption in the U.S. have not been reported, the possibility of such poisoning has been a subject of concern. In the U.S., the number of states that have issued health advisories limiting consumption of fish has risen steadily from 27 states in 1993 to 41 states in 1999. A total of 2,073 advisories were issued.
http://www.epa.gov/waterscience/fish/

Currently, concern is focused on the health impacts of chronic exposures to low levels of mercury from dietary sources. Preliminary estimates of mercury levels in hair and blood samples from the 1999 National Health and Nutrition Examination Survey suggest that approximately 10% of women have mercury levels within one tenth of potentially hazardous levels indicating a narrow margin of safety for some women. http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5008a2.htm.The National Research Council (NRC) issued a report estimating that as many as 60,000 newborns a year in the U.S. are now at risk for adverse neurodevelopmental effects from dietary mercury http://www.nap.edu/books/0309071402/html.These studies strongly support efforts to reduce methyl mercury exposure.