Name	Key	
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February 23, 2009

	Points Earned	Points Possible
Part 1		30
multiple choice		
Part 2		10
nomenclature		
Page 3		28
Page 4		18
Page 5		14
Total		100
		100

Note: All work must be shown to receive credit. On calculation problems show answer with the correct number of significant figures using scientific notation if necessary.

1A																	Noble
1 <b>H</b>	2A				- M	etals						3A	4A	5A	6A	7A	2 <b>He</b>
3 Li	4 Be				Me	etalloid						5 <b>B</b>	6 <b>C</b>	7 <b>N</b>	8 <b>O</b>	9 <b>F</b>	10 Ne
11 Na	12 <b>Mg</b>			1	No	onmetal	S					13 <b>Al</b>	14 Si	15 P	16 S	17 Cl	18 <b>Ar</b>
19 <b>K</b>	20 Ca	21 Sc	22 <b>Ti</b>	23 V	24 Cr	25 Mn	26 <b>Fe</b>	27 Co	28 Ni	29 <b>Cu</b>	30 <b>Zn</b>	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr
37 <b>Rb</b>	38 Sr	39 <b>Y</b>	40 <b>Zr</b>	41 Nb	42 <b>Mo</b>	43 Te	44 Ru	45 <b>Rh</b>	46 <b>Pd</b>	47 Ag	48 Cd	49 <b>In</b>	50 <b>Sn</b>	51 <b>Sb</b>	52 Te	53 I	54 Xe
55 Cs	56 <b>Ba</b>	57 La*	72 <b>Hf</b>	73 <b>Ta</b>	74 <b>W</b>	75 Re	76 <b>Os</b>	77 Ir	78 Pt	79 <b>Au</b>	80 <b>Hg</b>	81 <b>Tl</b>	82 <b>Pb</b>	83 <b>Bi</b>	84 <b>Po</b>	85 At	86 <b>Rn</b>
87 Fr	88 <b>Ra</b>	89 <b>Ac</b> †	104 <b>Rf</b>	105 <b>Db</b>	106 <b>Sg</b>	107 <b>Bh</b>	108 Hs	109 <b>Mt</b>	110 <b>Ds</b>	111 <b>R</b> g							
				58 Ce	59 <b>Pr</b>	60 <b>Nd</b>	61 <b>Pm</b>	62 Sm	63 <b>Eu</b>	64 <b>Gd</b>	65 <b>Tb</b>	66 <b>Dy</b>	67 <b>Ho</b>	68 Er	69 <b>Tm</b>	70 <b>Yb</b>	71 <b>Lu</b>
			†	90 <b>Th</b>	91 <b>Pa</b>	92 <b>U</b>	93 <b>Np</b>	94 <b>Pu</b>	95 <b>Am</b>	96 <b>Cm</b>	97 <b>Bk</b>	98 <b>Cf</b>	99 Es	100 <b>Fm</b>	101 <b>Md</b>	102 No	103 Lr

## Part 1 – Multiple Choice (30 points)

1.	Why s	study chemistry?		
	a.	To help us learn a technique for identifying a	and so	lving problems
	b.	To understand the behavior of materials		<b>.</b>
	C.	To help inform us about our world		
	d.	To be better able to make informed decision	S	
	e.	All the above		
2.	Which	is a scientific observation?		
	a.	Freezing and boiling are called physical char	naes	
	b.	If a substance has a density of 1.00g/mL it m		a water
	C.	When a substance freezes its molecules los		
	d.	Water freezes at zero degrees C	e pole	illiai eriergy.
		All of the above are scientific observations		
	e.	All of the above are scientific observations		
3.		established hypothesis is often called a(n)		fort
	a.	theory	C.	fact
	b.	observation	d.	law
4.		is a pure substance?		
	a.	coffee	C.	sugar
	b.	orange juice	d.	mud
5.	How n	nany significant digits are in the number 1.30	X 10 <sup>4</sup> ?	
	a.	1	C.	3
	b.	2	d.	4
6.	The n	umber, 14.74999, when rounded to three digit	s is	
	a.	10.0	C.	14.8
	b.	15.0	d.	14.7
7.	One k	ilometer is equal to		
	a.	100m	C.	0.001m
	b.	1000m	d.	0.01m
8.	When	expressed in proper scientific notation the nu	mber (	0.000034 is
		· · · · · · · · · · · · · · · · · · ·		3.4 X 10 <sup>-5</sup>
	b.	3.4 X 10 <sup>-4</sup>	e.	E
	C.	3.4 X 10 <sup>4</sup>	0.	0.17(10
9.	Which	type of element has the following general pro	pertie	s: low melting point and density
٠.		luster, poor conductor of heat and electricity, a		
	a.	Transition element	C.	Nonmetal
	b.	Metal	d.	Metalloid
	D.	Metal	u.	Metallolu
10.		mallest particle of an element that can exist is		
	a.	Ferrule	d.	Proton
	b.	Neutron	e.	Atom
	C.	Electron		

a.	2	d.	6
b.	3	e.	7
C.	5		
12. Whic	ch chemical symbol is properly wr	itten?	
a.	ca	C.	Cu
b.	CO	d.	CL

- - 1A 5A C. a. b. 3A 7A
- 14. Which is not a physical property of water?
  - Water is colorless.
  - The density of water at 4° C is 1.00g/mL. b.
  - The freezing point of water is 0° Celsius. C.
  - Water reacts with sodium metal to produce sodium hydroxide and hydrogen. d.
  - All of the above are physical properties of water e.
- 15. Hydrogen combines with oxygen to form water. If 1.67g of hydrogen combines with 13.33g of oxygen what mass of water will be produced?

a. 1.67g d. 13.33g 15.00g b. 16.67g e.

C. 11.66g

Part 2 – Nomenclature (10 points)

Fill in the following chart with the correct name or formula for the following elements and compounds.

Compound / Element Name	Formula / Elemental Symbol
vanadium	V
iodine	
Uranium	U
Copper	Cu
Zinc sulfide	ZnS
Ferrous chloride	FeCl <sub>2</sub>
Nitrogen monoxide	NO
Tribromine octoxide	Br <sub>3</sub> O <sub>8</sub>
Nickel(III) phosphide	NiP
Calcium fluoride	CaF <sub>2</sub>

## Part 3 – Problems and Questions (60 points)

1. (6 points) Evaluate each of the following expressions. State the answer to the proper number of significant figures.

a. 
$$68.353 + 3.98 + 255.33 = 327.66 \text{ or } 3.2766 \times 10^3$$

b. 
$$\frac{0.000844}{21.588} = 3.91 \times 10^{-5}$$

- 2. (8 points) Complete the following metric conversions using the correct number of significant figures. Put the answer in correct scientific notation.
  - a. 4.81 kg to mg

? 
$$mg = 4.81 \ kg \times \frac{1000 \ g}{1 \ kg} \times \frac{1000 \ mg}{1 \ g} = 4.81 \times 10^6 mg$$

b. 71.9 km to m

? 
$$m = 71.9 \text{ km} \times \frac{1000 \text{ m}}{1 \text{ km}} = 7.19 \times 10^4 \text{m}$$

- 3. (8 points) Complete the following American / metric conversions using the correct number of significant figures
  - a. 0.472 m to in

? 
$$in = 0.742 m \times \frac{100 cm}{1m} \times \frac{1 in}{2.54 cm} = 29.2 in$$

b. 6.31 qt to mL

$$?mL = 6.31 \ qt \times \frac{946 \ mL}{1 \ qt} = 5.70 \times 10^3 mL$$

4. (6 points) Complete the following temperature conversion 63 °C to °F

$$^{\circ}F = \left(63^{\circ}C \times \frac{180^{\circ}F}{100^{\circ}C}\right) + 32^{\circ}F = 145^{\circ}F$$

5. (6 points) After you have worked out at the gym on a stationary bike for 45 minutes, the distance gauge indicates that you have traveled 16.5 miles. What was your rate in km/hr (5280 ft = 1 mile)

$$?\frac{km}{hr} = \frac{16.5 \ mi}{45 \ min} \times \frac{60 \ min}{1 \ hr} \times \frac{5280 \ ft}{1 \ mi} \times \frac{12 \ in}{1 \ ft} \times \frac{2.54 \ cm}{1 \ in} = \frac{3.54 \times 10^6 km}{hr}$$

6. (6 points) Iron has a density of 7.87 g/mL. If 63.4 g of iron is added to 75.0 mL of water in a graduated cylinder, to what volume reading will the water level in the cylinder rise?

volume in graduated cylinder = 
$$75.0 \text{ mL} + 8.06 \text{ mL} = 83.1 \text{ mL}$$

What is the volume of the iron? (Hint: Do this part 1st)

? volume iron = 63.4 g iron 
$$\times \frac{1 \text{ mL iron}}{7.87 \text{ g iron}} = 8.06 \text{ mL iron}$$

7. (6 points) A personal trainer uses calipers on a client to determine his percent body fat. After taking the necessary measurements, the personal trainer determines that the client's body contains 12.5% fat by mass. If the client weighs 105 kg, how many kg of fat does he have?

$$? kg fat = 105 kg \times \frac{12.5 kg fat}{100 kg} = 13.1 kg fat$$

8. (8 points) Give definitions for the terms pure substance and mixture and give two examples of each type of material.

Pure substance – substance which is homogeneous throughout and can not be separated into simpler substances by physical means. Pure substances always have the same composition, regardless of where they are found or how they are made.

- 1. sugar
- 2. carbon

Mixture – substance which can be separated into individual substances by physical means. Different samples of a mixture may differ in composition.

- 1. gasoline
- 2. orange juice

9. (6 points) Aqueous solutions of the substance nickel(II) sulfate are bright green in color. If an aqueous solution of barium chloride is added to an aqueous solution of nickel(II) sulfate, a white precipitate of barium sulfate forms. Based on the information in the previous paragraph, identify a physical and chemical property of nickel(II) sulfate.

Physical property

Bright green in color Soluble in water

**Chemical Property** 

Reacts with barium chloride to form a white precipitate of barium sulfate