EXAM ONE **CHM 203 (Dr. Mattson)** **10 SEPTEMBER 2008**	***Academic Integrity Pledge:*** *In keeping with Creighton University's ideals and with the Academic Integrity Code adopted by the College of Arts and Sciences, I pledge that this work is my own and that I have neither given nor received inappropriate assistance in preparing it.* *Signature:*

Instructions: Show all work whenever a calculation is required! You will receive credit for <u>how</u> you worked each problem as well as for the correct answer. If you need more space, you may use the back of your periodic table — Write: "See PT" in box and then attach the periodic table. BOX YOUR ANSWERS! Write legibly.

CHAPTER 1. CHEMISTRY: MATTER AND MEASUREMENT

1. (10 pts) Print the names for these elements:

He	B
Ne	Na
Al	Cl
K	Ca
Zn	Ag

2. (6 pts) Give one example (write the atomic symbol) of each of the following:

Alkali metal
Alkaline earth
Non-metal
Metal
Transition metal
Main group element

3.(7 pts) What do these prefixes mean? Complete the table following the example shown.

Prefix:	**Symbol:**	**Definition:**
giga-	G	10^9
kilo-		
	μ	
		10^{-3}
	M	
centi-		
	n	
		10^{-12}

4. (4 pts) Convert 284 mm into meters.

5. (4 pts) Convert 28 μL into mL.

6(a) (5 pts) What is the volume in cm^3 of a block of wood measuring 23 mm by 1.7 cm by 0.035 m?

(6b) (4 pts) Suppose the block of wood described above had a mass of 9.44 g. What is the density of the block of wood?

6(c) (1 pts) How large is this block of wood?

A. One could pick it up with two fingers.
B. One could pick it up with two hands.
C. Two people would be needed to pick it up.

7. (4 pts) What is the volume of a sample of ethanol if its mass is 147 g and its density is 0.70 g/cm^3?

8. (5 pts) Cholesterol in blood has a concentration of about 2 g cholesterol/L blood. Express this concentration in units of μg cholesterol/mL blood.

CHAPTER 2. ATOMS, MOLECULES AND IONS

9. (5 pts) Carbon has an atomic diameter of 1.5 x 10^{-10} m. How many carbon atoms, lined up end-to-end, would it take to equal 1.0 cm?

10. (5 pts) The element iodine exists with only one important isotope. (a) From what you can gather from the periodic table, how many protons and neutrons does this isotope possess? (b) Write this isotope using the designation ${}^{a}_{b}E$.

(a)

(b)

11. (5 pts) Copper exists as two isotopes: ${}^{63}_{29}Cu$ which represents 69.17% and has an exact mass of 62.94 amu and ${}^{65}_{29}Cu$. What is the exact mass of ${}^{65}_{29}Cu$?

12(a) (3 pts) Give an example of a

homogeneous mixture
heterogeneous mixture
pure substance

12(b) (1 pt) Pure substances can be either elements or _____.

13. (10 pts) Identify each of these as being ionic (I) or covalent-molecular (CM). Circle I or CM.

$Ca(NO_3)_2$	I or CM	$Al_2(SO_4)_3$	I or CM
$BaCl_2$	I or CM	SCl_2	I or CM
NBr_3	I or CM	$MgCO_3$	I or CM
SO_3	I or CM	KOH	I or CM
NO_2	I or CM	$CuSO_4$	I or CM

14. (10 pts) Write formulas for these ions. Include correct charge for credit.

carbonate	sulfide
nitrate	ammonium
nitrite	hydroxide
sulfate	acetate
sulfite	phosphate

15. (10 pts) Naming ionic compounds. Complete the table. Please print.

Name:	**Formula:**
sodium chloride	
magnesium bromide	
lithium nitrate	
potassium carbonate	
barium hydroxide	
	MgI_2
	Al_2O_3
	$NaClO_4$
	Li_2O_2
	$Ca(HCO_3)_2$

(1 pt) Print your name here and sign Academic Integrity Statement on other side.

❑ *Please send my grades via e-mail.*

Your exam score (100 possible): _____

Determine your grade:
A+ ≥ 95; A ≥ 90; B+ ≥ 85; B ≥ 80; C+ ≥ 75; C ≥ 70; D ≥ 60

Answers:

1.

He helium	B boron
Ne neon	Na sodium
Al aluminum	Cl chlorine
K potassium	Ca calcium
Zn zinc	Ag silver

2.

Alkali metal: Li, Na, K, Rb, Cs
Alkaline earth: Be, Mg, Ca, Sr, Ba, Ra
Non-metal: H, He, B, C, N, O, F, Ne, P, S, Cl, Ar, As, Se, Br, Kr, Te, I, Xe, At, Rn
Metal: any element other than those listed above
Transition metal: Elements 21 – 30, 39 – 48, or 72 - 80
Main group element: Any element from Groups IA thru VIIIA (Groups 1, 2, 13 – 18)

3.

Prefix:	Symbol:	Definition:
giga-	G	10^{9}
kilo-	K	10^{+3}
micro-	μ	10^{-6}
milli-	m	10^{-3}
mega-	M	10^{+6}
centi-	c	10^{-2}
nano-	n	10^{-9}
pico-	p	10^{-12}

4. 0.284 m

5. 0.028 mL

6(a) 13.7 cm^3 ; 6(b) 0.69 g/ cm^3; 6(c) A

7. 210 cm^3?

8. 2000 μg cholesterol/mL blood.

9. 6.7 x 10^7 C atoms

10. (a) 53 protons and 74 neutrons; (b) $^{127}_{53}I$.

11. 64.90 amu

12(a)

homogeneous mixture: two or more things that appear as one pure thing: examples: gasoline, salt water, tea, Kool Aid, pancake syrup
heterogeneous mixture: two or more things that are often clearly visible: examples: Raisin muffins, a tossed salad, concrete, river water. Sometimes, the heterogeneous mixture separates upon standing, such as paint, river water
pure substance: any element or compound

12(b) Pure substances can be either elements or compounds.

13.

$Ca(NO_3)_2$	I	$Al_2(SO_4)_3$	I
$BaCl_2$	I	SCl_2	CM
NBr_3	CM	$MgCO_3$	I
SO_3	CM	KOH	I
NO_2	CM	$CuSO_4$	I

14.

carbonate CO_3^{-2}	sulfide S^{-2}
nitrate NO_3^-	ammonium NO_4^+
nitrite NO_2^-	hydroxide OH^-
sulfate SO_4^{-2}	acetate $C_2H_3O_2^-$
sulfite SO_3^{-2}	Phosphate PO_4^{-3}

15.

Name:	Formula:
sodium chloride	NaCl
magnesium bromide	$MgBr_2$
lithium nitrate	$LiNO_3$
potassium carbonate	K_2CO_3
barium hydroxide	$Ba(OH)_2$
magnesium iodide	MgI_2
aluminum oxide	Al_2O_3
sodium perchlorate	$NaClO_4$
lithium peroxide	Li_2O_2
calcium bicarbonate	$Ca(HCO_3)_2$