Exam One **CHM 203 (Dr. Mattson)** **5 SEPTEMBER 2007**	***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. This exam is worth 100 points. BOX YOUR ANSWERS!

Chapter 1. Matter and Measurement

1. (8 pts) Circle the element that is an example of each of these group names:

Transition metal:	Mg	Si	Ar	Fe	Br
Halogen:	Cl	Kr	C	Ca	P
Main group:	Mn	Sc	Xe	Co	U
Alkali metal:	Rh	Rb	Ra	Rn	Ru
Alkaline earth:	Rh	Rb	Ra	Rn	Ru
Lanthanide:	Be	Na	W	Sb	Tb
Group 4A:	Al	Ge	Sb	Zr	I
Noble gas:	O	F	Cl	Ar	N

2. (6 pts) Write the atomic symbol for each of these elements

calcium
potassium
argon
chlorine
fluorine
magnesium

3. (6 pts) Circle the one equality from each group that is correct.

1 nm = $1x10^{9}$ m	1 nm = $1x10^{-9}$ m	1 m = $1x10^{-9}$ nm
1 m = $1x10^{-2}$ cm	1 cm = $1x10^{2}$ m	1 m = $1x10^{2}$ cm
1 mL = 0.001 L	1 L = 1 m^3	1 mL = 1000 L

4. (6 pts) How many nanoliters are in 0.0063 mL?

5. (6 pts) Human blood typically has a cholesterol level of 200 mg/100 mL. Convert this to μg/L.

6. (6 pts) What is the mass of a 250 mL sample of chloroform, density = 1.48 g/cm^3?

7. (6 pts) Suppose a certain dog medication carried a dosage of 25 μg/kg body weight. How many milligrams should a 50 pound dog receive? [Given: 1 pound = 0.454 kg]

8 (6 pts)Write the prefix **and** the symbol for each of these:

1 x 10^{9}	*giga G*
1 x 10^{6}	
1 x 10^{3}	
1 x 10^{-2}	
1 x 10^{-3}	
1 x 10^{-6}	
1 x 10^{-9}	

Chapter 2. Atoms, Molecules and Ions

9. (9 pts) How many protons, neutrons and electrons are represented in each of the following isotopes?

	Protons	Neutrons	Electrons
$^{23}_{11}Na$			
$^{79}_{34}Se$			
$^{173}_{70}Yb$			

10. (4 pts) Identify the following elements

$^{55}_{25}E$	$^{201}_{80}E$

11. (9 pts) Identify the sort of pure substance that each of the following represents. Circle: Element, Ionic, or Covalent-Molecular.

KBr	Element	Ionic	Covalent-Molecular
CaC_2	Element	Ionic	Covalent-Molecular
CO_2	Element	Ionic	Covalent-Molecular
P_4	Element	Ionic	Covalent-Molecular
$MgSO_4$	Element	Ionic	Covalent-Molecular
SO_3	Element	Ionic	Covalent-Molecular
$ZnCO_3$	Element	Ionic	Covalent-Molecular
IF_5	Element	Ionic	Covalent-Molecular
V	Element	Ionic	Covalent-Molecular

12. (6 pts) Only one member of each series is an actual, known ionic compound. Circle it in each case.

a. NaCl CaCl MgBr KO LiS

b. CaS_2 Be_2N KCl_2 Li_2Br $MgCl_2$

c. NaO_3 $SrCl_3$ Li_3P KCl_3 Rb_3O

13. (9 pts) Circle the correct formula for each of these ions:

a. carbonate	CO_2^{2-}	CO_3^{-}	CO_2^{-}	CO_3^{2-}
b. sulfite	SO_3^{-}	SO_4^{2-}	SO_3^{-2}	HSO_3^{-}
c. nitrate	NO_3^{2-}	NO_3^{-}	NO_2^{2-}	NO_2^{-}
d. bicarbonate	CO_3^{2-}	HCO_3^{2-}	HCO_3^{-}	$C_2O_6^{4-}$
e. phosphate	PO_4^{2-}	PO_3^{3-}	PO_4^{3-}	PO_3^{2-}
f. sulfate	SO_3^{2-}	SO_4^{2-}	SO_4^{-}	SO_3^{-}
g. nitrite	NO_3^{2-}	NO_3^{-}	NO_2^{2-}	NO_2^{-}
h. acetate	$CH_3O_2^{-}$	$C_2O_2^{-}$	$C_2H_3O^{-}$	$C_2H_3O_2^{-}$
i. ammonium	NH_3^{2-}	NO_4^{-}	NH_4^{+}	NO_4^{+}

14. (5 pts) Some of these pairs of compounds are examples of the law of multiple proportions? Circle them.

a. CH_4 and CO_2 b. CH_4 and C_2H_4

c. SO_2 and SO_3 d. $SnCl_2$ and $SnCl_4$

e. C_2H_2 and C_6H_6

15. (5 pts) Silver metal has two naturally occurring isotopes: ^{107}Ag (51.84%) with an isotope mass of 106.9051 amu and ^{109}Ag (48.16%) with an isotope mass of 108.9048 amu. What is the atomic mass of silver?

16. (3 pts) Write the formula for these compounds

chromium(III) sulfate
tin(IV) bromide
iron(III) oxide

Sign the Academic Integrity pledge (on the front) *and* print your name here:

Your exam score (100 possible): _____

Determine your grade:

A+ ≥ 95; A ≥ 90; B+ ≥ 85; B ≥ 80; C+ ≥ 75; C ≥ 70; D ≥ 60

Answers

1.

Transition metal:	Mg	Si	Ar	**Fe**	Br
Halogen:	**Cl**	Kr	C	Ca	P
Main group:	Mn	Sc	**Xe**	Co	U
Alkali metal:	Rh	**Rb**	Ra	Rn	Ru
Alkaline earth:	Rh	Rb	**Ra**	Rn	Ru
Lanthanide:	Be	Na	W	Sb	**Tb**
Group 4A:	Al	**Ge**	Sb	Zr	I
Noble gas:	O	F	Cl	**Ar**	N

2.

calcium	Ca
potassium	K
argon	Ar
chlorine	Cl
fluorine	F
magnesium	Mg

3.

$1\ nm = 1x10^{-9}\ m$
$1\ m = 1x10^{2}\ cm$
$1\ mL = 0.001\ L$

4. 6.30×10^{3} nL

5. 2.00×10^{6} µg/L

6. 370 g

7. 0.57 mg

8.

1×10^{9}	*giga*	*G*
1×10^{6}	*mega*	*M*
1×10^{3}	*kilo*	*k*
1×10^{-2}	*centi*	*c*
1×10^{-3}	*milli*	*m*
1×10^{-6}	*micro*	*µ*
1×10^{-9}	*nano*	*n*

9.

	Protons	**Neutrons**	**Electrons**
$^{23}_{11}Na$	11	12	11
$^{79}_{34}Se$	34	45	34

$^{173}_{70}Yb$	70	103	70

10. (4 pts) Identify the following elements

$^{55}_{25}E$ manganese	$^{201}_{80}E$ mercury

11.

KBr	Element	Ionic	Covalent-Molecular
CaC_2	Element	Ionic	Covalent-Molecular
CO_2	Element	Ionic	Covalent-Molecular
P_4	Element	Ionic	Covalent-Molecular
$MgSO_4$	Element	Ionic	Covalent-Molecular
SO_3	Element	Ionic	Covalent-Molecular
$ZnCO_3$	Element	Ionic	Covalent-Molecular
IF_5	Element	Ionic	Covalent-Molecular
V	Element	Ionic	Covalent-Molecular

12.

a. NaCl

b. $MgCl_2$

c. Li_3P

13. (9 pts) Circle the correct formula for each of these ions:

a. carbonate CO_3^{2-}

b. sulfite SO_3^{-2}

c. nitrate NO_3^-

d. bicarbonate HCO_3^-

e. phosphate PO_4^{3-}

f. sulfate SO_4^{2-}

g. nitrite NO_2^-

h. acetate $C_2H_3O_2^-$

i. ammonium NH_4^+

14. b, c, and d.

15. 107.87 amu

16.

$Cr_2(SO_4)_3$

$SnBr_4$

Fe_2O_3