EXAM ONE **CHM 203 (Dr. Mattson)** **8 SEPTEMBER 2010**	***Print your name:*** ***Signature:***	***Circle your section:*** ***8:30 9:30***

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.

1. (8 pts) Write the atomic symbols for the following elements.

aluminum	boron
zinc	fluorine
potassium	neon
sulfur	chlorine

2. (7 pts) Circle the element from each list that is an example of the family or group name.

alkali metal	B	N	O	F	Li
alkaline earth	K	P	Cl	Ca	Co
halogen	Br	S	Na	Zn	Cr
main group	Sc	Fe	Au	U	Xe
semimetal	C	Si	Sn	Cr	Ca
non-metal	Co	Li	N	Pb	Ag
actinide	Ag	Sc	Y	Ne	U

3. (4 pts) Convert 4.57 mL into μL. Show all work, starting with "Vol ="; give the units with every step! Express answer in scientific notation.

4. (3 pts) Write a "plan" with the looped arrows for converting a volume in gallons into cm^3. If you were actually doing it, you would be given the conversion of gallons into liters.

5. (5 pts) Convert the area of Nebraska, 77,358 mi^2, into km^2. Given: 1 mile = 1.606 km.

6. (5 pts) The density of tungsten is 19.3 g/cm^3. What is the mass of a block of tungsten measuring 5.0 cm X 7.2 cm X 22 mm?

7. (4 pts) Bromine has a melting point of -7.2 ^oC. Express this value in ^oF. Given: $T_c = (T_F - 32)/1.8$

8. (5 pts) A chunk of metal with a mass of 47.9 g has a volume of 7.84 mL. If it is known that the metal is one of these: titanium, vanadium, chromium, manganese or cobalt, which one is it?

Element, density	*Show work here:*
Ti, 4.54 g/ cm^3	
V, 6.11 g/ cm^3	
Cr, 7.19 g/ cm^3	
Mn, 7.44 g/ cm^3	
Co, 8.90 g/ cm^3	

9. Suppose one heated sulfur and calcium metal together in a test tube. After some heating, one would observe a very bright flame that lasted only a second or two.

   A. (3 pts) Each of the following occurs. Designate each as a physical (P) or chemical (C) change:

   P C The sulfur melted as heat was applied.

   P C Sulfur and metallic calcium formed calcium sulfide.

   P C The calcium sulfide solidified.

9B. (1 pt) Referring again to the sulfur and calcium together in the test tube. Which term best describes the contents of the test tube prior to heating:

A. a heterogeneous mixture

B. a homogeneous mixture

C. a chemical compound

9c. (1 pt) The calcium sulfide produced is:

A. an ionic compound

B. a covalent molecular compound

10. (2 pts) Suppose Compounds A and B are related in that they are examples of the Law of Multiple Proportions. What do A and B have in common?

A. The same mass and volume

B. The same color and texture

C. The same melting and boiling point

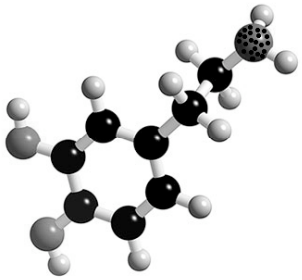
D. The same list of atoms

E. The same chemical name

11. (9 pts) How many protons, neutrons and electrons are in each of the following?

	Protons	Neutrons	Electrons
$^{52}_{24}Cr$			
$^{31}_{15}P^{3-}$			
$^{88}_{38}Sr^{2+}$			

12 (3 pts) The molecule pictured here is dopamine; it consists of carbon (black spheres), hydrogen (small gray spheres), oxygen (large gray spheres) and nitrogen (speckled gray sphere). What is the formula for dopamine? Use the format $C_wH_xN_yO_z$.



13. Phosphorus exists as only one isotope.

A. (1 pt) What is this isotope? Use format $^{y}_{x}P$.

B. (1 pt) What is the exact mass of this isotope?

C. (2 pt) Imagine instead that phosphorus existed as 50% the isotope you wrote in 13A, and 50% as an isotope with a mass number two greater than the first isotope. The atomic mass on the periodic table would have to be changed to a value close to:

A. 29 B. 30 C. 31 D. 32 E. 33

14. (6 pts) Characterize each of the following compounds as ionic or covalent-molecular just be inspecting the formula.

$KClO_3$	Ionic	Covalent-Molecular
$C_2H_3Cl_3$	Ionic	Covalent-Molecular
SO_2	Ionic	Covalent-Molecular
$NaNO_3$	Ionic	Covalent-Molecular
$(NH_4)_2CO_3$	Ionic	Covalent-Molecular
CH_4	Ionic	Covalent-Molecular

15. (10 points) Circle the formula that matches the ion names below

carbonate	CO_3^{2-}	CO_4^{2-}	CO_3^{-}	CO_2^{-}
nitrite	NO_3^{2-}	NO_2^{2-}	NO_3^{-}	NO_2^{-}
sulfate	SO_3^{-}	SO_3^{2-}	SO_4^{2-}	SO_4^{-}
thiocyanate	SCN^{-}	SCN^{2-}	SCN_3^{2-}	CN^{-}
nitrate	NO_2^{-}	NO_2^{2-}	NO_3^{-}	NO_3^{2-}
ammonium	NH_3^{+}	NH_3^{-}	NH_4^{-}	NH_4^{+}
hydroxide	OH^{2-}	OH^{-}	OH_3^{-}	HO_3^{2-}
phosphate	PO_4^{3-}	PO_3^{3-}	PO_3^{2-}	PO_3^{-}
perchlorate	ClO^{-}	ClO_2^{-}	ClO_3^{-}	ClO_4^{-}
sulfide	S^{2-}	SO_3^{2-}	SO_4^{2-}	SO_2^{2-}

Print your name below:

For DocM to complete:

Subtotal from exam: _____

Homework: (20 max) _____

Total: _____

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

Answers

1. Al, Zn, K, S, B, F, Ne, Cl

2. Li, Ca, Br, Xe, Si, N, U

3. 4.57 x 10^3 μL

4. gallons → quarts → L → mL → cm^3

5. 199,500 km^2
6. 1529 g

7. 19.0 ^oF

8. d = 6.11 g/ cm^3; vanadium

9A. P, C, P
9B. A

9c. A

10. D
11.

	Protons	Neutrons	Electrons
$^{52}_{24}Cr$	24	28	24
$^{31}_{15}P^{3-}$	15	16	18
$^{88}_{38}Sr^{2+}$	38	50	36

12 $C_8H_{11}NO_2$

13A. $^{31}_{15}P$

B. 30.97 amu

C. 32

14. I, CM, CM, I, I, CM

15. CO_3^{2-}, NO_2^-, SO_4^{2-}, SCN^-, NO_3^-, NH_4^+, OH^-, PO_4^{3-}, ClO_4^-, S^{2-}