

Exam 1 Chm 203 (Dr Mattson) 14 September 2015

Academic Integrity Pledge: *In keeping with Creighton University's ideals and with the Academic Integrity Code, I pledge that this work is my own and that I have neither given nor received inappropriate assistance in preparing it.*

Signature: _____

Name: _____

Chemistry Student Number:
(the number you write on your folder activity sheets)

Instructions: Show all work whenever a calculation box is provided! Write legibly. Include units whenever appropriate. You will receive credit for **how** you worked each problem as well as for the correct answer. If you need more space, you may use the back of the periodic table provided — Write: "See PT" in the answer box and then hand the periodic table in with your exam. On your desk you are allowed only pencils (but no pencil pouch), an eraser, and a non-programmable calculator without a slipcover. Backpacks, bags, and purse-like items must be closed and stored on the floor under the table. Cell phones must be OFF and placed in your backpack/bag/purse – not in your pocket.

1. (5 pts) Write the relationship (using an equal sign) between each of these:

- a. pg and g
- b. m and nm
- c. cL and L
- d. kJ and J
- e. K and MK

2. (3 pts) Convert 4.5×10^{-4} g into mg.

Answer with units: _____

3. (3 pts) Convert 115 μ L into L. Use scientific notation

Answer with units: _____

4. (4 pts) Convert 844 pm into μ m.

Answer with units: _____

5a. (4 pts) What is the volume of a cylinder with height, h , of 10.88 cm and a radius of 5.73 cm given the formula for the volume of a cylinder, $V_{\text{cylinder}} = \pi r^2 h$?

Answer with units: _____

5b. (1 pt) Would this cylinder be able to hold 1.0 L of a liquid? **Circle: Yes or No**

6. (5 pts) What is the mass of 50.00 mL liquid mercury, given that mercury has a density of 13.56 g/cm^3 ?

Answer with units: _____

7. (5 pts) Water has an approximate density of 1.0 g/cm^3 . What is the mass in kg of 1.0 ft^3 of water? **Given: 1 ft = 12 inches and 1 inch = 2.54 cm.**

Answer with units: _____

8. (5 pts) At 25°C molecules of oxygen have an average speed of 490 m/s. Express this in units of miles per hour. **Given: 1 mi = 1.61 km.**

Answer with units: _____

9. (10 pts) Provide the atomic symbols for these elements:

- | | |
|-------------|--------------|
| a. lead | f. helium |
| b. chlorine | g. potassium |
| c. sodium | h. argon |
| d. gold | i. chromium |
| e. iron | j. magnesium |

10. (6 pts) Which of these are physical or chemical properties of calcium? **Circle Physical or Chemical**
- Physical** or **Chemical** Calcium metal is a soft, lustrous, substance with a melting point of 842 °C.
 - Physical** or **Chemical** Calcium is never found in its elemental form in nature because it is too reactive to be stable.
 - Physical** or **Chemical** Calcium reacts with air, water, the halogens, and even nitrogen.
 - Physical** or **Chemical** Calcium has a density of 1.54 g/cm³.
 - Physical** or **Chemical** Calcium burns in air.
 - Physical** or **Chemical** Calcium is a good conductor of electricity.

- 11a. (4 pts) Gold consists of entirely one isotope. Using the periodic table, how many protons and neutrons does this isotope have?

- 11b. (3 pts) Write this isotope of gold using the format for isotope notation, ${}^y_x E$.

12. (4 pts) Copper consists of two isotopes. One isotope has an isotopic mass of 62.9295989 amu and an abundance of 69.17%. The other isotope has a mass of 64.9277929 amu. Calculate the atomic mass of copper.

Answer with units: _____

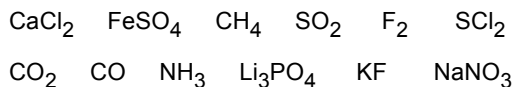
- 13a. (4 pts) How many moles of potassium are in a sample with a mass of 4.55 g?

Answer with units: _____

- 13b. (4 pts) Using Avogadro's number, how many atoms of potassium are in this sample? $N_A = 6.02 \times 10^{23}$

Answer with units: _____

14. (12 pts) Circle all of the compounds that are covalent-molecular.



- 15a. (1 pts) Give an example of an alkali metal element by writing its atomic symbol in the box.

- 15b. (1 pts) Give an example of an alkaline earth metal element by writing its atomic symbol in the box.

- 15c. (1 pts) Give an example of a halogen element by writing its atomic symbol in the box.

- 15d. (1 pts) Give an example of noble gas element by writing its atomic symbol in the box.

- 15e. (1 pts) Give an example of a transition metal element by writing its atomic symbol in the box.

- 15f. (1 pts) Give an example of a main group metal element by writing its atomic symbol in the box.

- 15g. (1 pts) Give an example of a semi-metal element by writing its atomic symbol in the box.

- 15h. (1 pts) Give an example of a non-metal main element by writing its atomic symbol in the box.

16. (10 pts) Nomenclature. Complete the following table. (If you are nomenclature certified, skip this question.)

Name	Formula
sodium sulfate	
potassium carbonate	
sulfur tetrafluoride	
nitrogen tribromide	
vanadium(III) nitrate	
	LiNO ₂
	(NH ₄) ₂ SO ₃
	KC ₂ H ₃ O ₂
	Fe ₂ S ₃
	NaI

Total score (out of 100): _____

A+ > 95% A > 90% B+ > 85% B > 80% C+ > 75% C > 70% D > 60%

Answers

1. a. $1 \text{ pg} = 1 \times 10^{-12} \text{ g}$; b. $1 \times 10^{-9} \text{ m} = 1 \text{ nm}$; c. $1 \text{ cL} = 1 \times 10^{-2} \text{ L}$; d. $1 \text{ kJ} = 1 \times 10^3 \text{ J}$; e. $1 \times 10^6 \text{ K} = \text{MK}$

2. 0.45 mg

3. $1.15 \times 10^{-4} \text{ L}$

4. length = $8.44 \times 10^{-4} \text{ }\mu\text{m}$

5a. 1122 cm^3

5b. Yes

6. 678 g

7. 283 kg

8. 1096 miles / hour

9. Pb, Cl, Na, Au, Fe, He, K, Ar, Cr, Mg

10. a. Physical; b. Chemical; c. Chemical; d. Physical; e. Chemical; f. Physical

11a. 79 Protons and 118 neutrons

11b. ${}_{79}^{197}\text{Au}$

12. 63.55 g/mol

13a. 0.116 mol

13b. 7.01×10^{22} potassium atoms

14. CH_4 SO_2 F_2 SCl_2 CO_2 CO NH_3

15a. Li, Na, K, etc.

15b. Be, Mg, Ca, etc.

15c. F, Cl, Br, etc.

15d. He, Ne, Ar, etc

15e. Sc...Zn, Y...Cd, etc.

15f. Anything from Group I or II or Ga, In, Tl, Sn, Pb, Bi

15g. Si, Ge, As, Sb, Te

15h. C, N, O, P, S, Se or any halogen or noble gas

16.

Name	Formula
sodium sulfate	Na_2SO_4
potassium carbonate	K_2CO_3
sulfur tetrafluoride	SF_4
nitrogen tribromide	NBr_3
vanadium(III) nitrate	$\text{V}(\text{NO}_3)_3$
lithium nitrite	LiNO_2
ammonium sulfite	$(\text{NH}_4)_2\text{SO}_3$
potassium acetate	$\text{KC}_2\text{H}_3\text{O}_2$
iron(III) sulfide	Fe_2S_3
sodium iodide	NaI