

EXAM ONE
CHM 203 (Dr. Mattson)
9 SEPTEMBER 2009

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 how 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) Write the atomic symbols and the atomic numbers for these elements:

Element	Atomic Symbol	Atomic Number
neon		
magnesium		
potassium		
silver		
chlorine		

2. (6 pts) Each member of the following series is from the same family or period, with the exception of one. Circle the member that does not belong.

- (a) carbon silicon gallium lead
(b) sodium lithium potassium calcium
(c) oxygen selenium sulfur fluorine
(d) iron cobalt chromium tin
(e) neon sulfur chlorine silicon
(f) boron carbon sulfur neon

3. (6 pts) Indicate if these relationships are true or false.

T F $1 \text{ mL} = 1 \times 10^{-3} \text{ L}$

T F $1 \text{ m} = 1 \times 10^{-6} \mu\text{m}$

T F $1 \text{ ps} = 1 \times 10^{12} \text{ s}$

T F $1 \text{ kg} = 1 \times 10^3 \text{ g}$

T F $1 \text{ ng} = 1 \times 10^{-9} \text{ g}$

T F $1 \mu\text{L} = 1 \times 10^{-6} \text{ L}$

T F $1 \text{ Gs} = 1 \times 10^{+9} \text{ s}$

4. (4 pts) Convert 0.00462 g into micrograms and express your answer in scientific notation.

5. (4 pts) Our chemistry book is 3.40 cm thick and contains 550 sheets. How thick, in μm , is each sheet of paper?

6. (5 pts) Convert 20.0 gallons to liters. [Given: 1 gallon = 4 quarts and 1 L = 1.06 quarts]

7. (4 pts) One of the most useful equalities of the metric system is that $1 \text{ cm}^3 = 1 \text{ mL}$. What is the density in units of g/cm^3 of a 57.32 g sample of metal with a volume of 9.22 mL?

8. (2 pts) Only one of these pairs of substances demonstrates the law of multiple proportions. Which is it?

- A. NO_2 and N_2O_4 B. CH_4 and CO_2
C. NO_2 and N_2O B. O_2 and O_3

9. (4 pts) What is the mass of a sample of ethanol if its volume is 8.92 L and its density is 0.70 g/cm³?

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10. (5 pts) A 0.80 kg bag of candy contains the following information: 1 serving = 6 pieces = 52 g. Approximately how many pieces of candy are in the bag?

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CHAPTER 2. ATOMS, MOLECULES AND IONS

11. (8 pts) The element phosphorus 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_bE .

(a) _____ protons _____ neutrons _____ electrons	
(b)	

12. (3 pts) Sulfur exists as four isotopes: ${}^{32}_{16}S$, ${}^{33}_{16}S$, ${}^{34}_{16}S$, and ${}^{36}_{16}S$ (there is apparently no ${}^{35}_{16}S$). One of these isotopes accounts for 95.0% of all sulfur and the other three account for the remaining 5.0%. Which isotope is the most abundant?

A. ${}^{32}_{16}S$ B. ${}^{33}_{16}S$ C. ${}^{34}_{16}S$ D. ${}^{36}_{16}S$

13. (2 pts) How many electrons are there in these ions?

Au ⁺³	S ⁻²
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14. (8 pts) Identify each of these as being ionic (I) or covalent-molecular (CM). Circle I or CM.

MgCO ₃	I or CM	PCl ₅	I or CM
NH ₃	I or CM	AgCl	I or CM
KOH	I or CM	SO ₂	I or CM
CO ₂	I or CM	KNO ₃	I or CM

15. (10 pts) Write formulas for these ions. Include correct charge for credit.

phosphate	sulfite
nitrite	ammonium
nitrate	hydroxide
sulfide	acetate
sulfate	carbonate

16. (8 pts) Naming ionic compounds. Indicate which of these are properly matched between name and formula **and** contain no formula mistakes.

		Name:	Formula:
T	F	sodium nitrate	NaNO ₃
T	F	magnesium carbonate	MgCO ₃
T	F	lithium bromide	LiBr
T	F	potassium sulfate	K ₂ SO ₄
T	F	dialuminum trioxide	Al ₂ O ₃
T	F	sodium perchlorate	Na ₂ ClO ₄
T	F	potassium oxide	KO
T	F	calcium acetate	Ca(C ₂ H ₃ O ₂) ₂

17. (4 pts) In class, we saw samples of Cu₂O and CuO when we were talking about the law of multiple proportions. Name these two compounds.

CuO	
Cu ₂ O	

18. (5 pts) Which of these formulas of compounds, all of which exist, are properly named?

T	F	CO ₂	carbon dioxide
T	F	SO ₃	sulfur trioxide
T	F	P ₂ S ₅	diphosphorus pentasulfide
T	F	NO	nitrogen oxide
T	F	SnCl ₄	sulfur(IV) chloride

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

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Your exam score (100 possible): _____
Determine your grade:
 A+ ≥ 95; A ≥ 90; B+ ≥ 85; B ≥ 80; C+ ≥ 75; C ≥ 70; D ≥ 60

Answers:

1.

Element	Atomic Symbol	Atomic Number
neon	Ne	10
magnesium	Mg	12
potassium	K	19
silver	Ag	47
chlorine	Cl	17

2. (a) gallium (b) calcium (c) fluorine
(d) tin (e) neon (f) sulfur

3. T, F, F, T, T, T, T

4. $4.62 \times 10^3 \mu\text{g}$

5. $61.8 \mu\text{m}$

6. 75.5L

7. $6.22\text{g}/\text{cm}^3$

8. NO_2 and N_2O

9. 6244 g

10. 92 pieces

11. (a) 15 protons, 16 neutrons, and 15 electrons

(b) ${}_{15}^{31}\text{P}$.

12. ${}_{16}^{32}\text{S}$

13. 76 and 18

14.

MgCO_3	I	PCl_5	CM
NH_3	CM	AgCl	I
KOH	I	SO_2	CM
CO_2	CM	KNO_3	I

15.

phosphate, PO_4^{-3}	sulfite, SO_3^{-2}
nitrite, NO_2^-	ammonium, NH_4^+
nitrate, NO_3^-	hydroxide, OH^-
sulfide, S^{-2}	acetate, $\text{C}_2\text{H}_3\text{O}_2^-$
sulfate, SO_4^{-2}	carbonate, CO_3^{-2}

16. T, T, T, T, F, F, F, T

17.

CuO	copper(II) oxide or cupric oxide
Cu_2O	copper(I) oxide or cuprous oxide

18. T, T, T, F, F