CHAPTER 7 REVIEW

Chemical Formulas and Chemical Compounds

MIXED REVIEW

SHORT ANSWER Answer the following questions in the space provided.

- **1.** Write formulas for the following compounds:
- **a.** copper(II) carbonate **b.** sodium sulfite **c.** ammonium phosphate **d.** tin(IV) sulfide e. nitrous acid
- **2.** Write the Stock system names for the following compounds:
- _____ **a.** $Mg(ClO_4)_2$ **b.** Fe(NO₃)₂ _____ **c.** Fe(NO₂)₃ _____ **d.** CoO e. dinitrogen pentoxide **3.** _____ **a.** How many atoms are represented by the formula $Ca(HSO_4)_2$? **b.** How many moles of oxygen atoms are in a 0.50 mol sample of this compound? **c.** Assign the oxidation number to sulfur in the HSO_4^- anion. **4.** Assign the oxidation number to the element specified in each of the following: **_____ a.** hydrogen in H_2O_2 **_____ b.** hydrogen in MgH₂ **_____ c.** sulfur in S_8 _____ **d.** carbon in $(CO_3)^{2-}$
 - **e.** chromium in $Na_2Cr_2O_7$
 - **____ f.** nitrogen in NO_2

PROBLEMS Writes space provided.	te the answer on the line to the left	. Show all your work in the	
5	Following are samples of for order of increasing mass, from	of four different compounds. Arrange them in s, from smallest to largest.	
	 a. 25 g of oxygen gas b. 1.00 mol of H₂O 	c. 3×10^{23} molecules of C ₂ H ₆ d. 2×10^{23} molecules of C ₂ H ₆ O ₂	
6	a. What is the formula for s	sodium hydroxide?	
	b. What is the formula mass	s of sodium hydroxide?	
	c. What is the mass in gram	ns of 0.25 mol of sodium hydroxide?	
7	What is the percentage comp whole number?	position of ethane gas, C_2H_6 , to the nearest	
8	Ribose is an important sugar 150.15 g/mol. If its empirica formula?	c (part of RNA), with a molar mass of I formula is CH ₂ O, what is its molecular	

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often used as a fuel.	
a. What is the mass in grams of 3	3.00 mol of butane?
b. How many molecules are prese	ent in that 3.00 mol sample?
c. What is the empirical formula	of the gas?
Naphthalene is a soft covalent soli molar mass is 128.18 g/mol and it hydrogen. Determine the molecula information.	id that is often used in mothballs. Its t contains 93.75% carbon and 6.25% ar formula of napthalene from this
	 Date

11. Nicotine has the formula $C_x H_y N_z$. To determine its composition, a sample is burned in excess oxygen, producing the following results:

 $\begin{array}{l} 1.0 \text{ mol of } \text{CO}_2 \\ 0.70 \text{ mol of } \text{H}_2\text{O} \\ 0.20 \text{ mol of } \text{NO}_2 \end{array}$

Assume that all the atoms in nicotine are present as products.

a. Determine the number of moles of carbon present in the products of this combustion.

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	b. Determine t the combust	he number of moles ion products.	of hydrogen present in	
	c. Determine t combustion	he number of moles products.	of nitrogen present in the	
	d. Determine t calculations	he empirical formula	a of nicotine based on your	
	e. In a separate somewhere of nicotine t	e experiment, the mo between 150 and 18 to the nearest gram.	olar mass of nicotine is found to be 0 g/mol. Calculate the molar mass	
12. When MgCO ₃ (<i>s</i>) is strongl	y heated, it produ	UCES SOLID MgO as g What is the percen reaction occurs?	aseous CO_2 is driven off. tage loss in mass as this	
	b.	Assign the oxidation	on number to each atom in MgCO	3.
	c.	Does the oxidation formation of CO_2 ?	number of carbon change upon th	ne

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SHORT ANSWER Answer the following questions in the space provided.

1. Write formulas for the following compounds:

CuCO ₃	a. copper(II) carbonate	
Na ₂ SO ₃	b. sodium sulfite	
(NH ₄) ₃ PO ₄	c. ammonium phosphate	
SnS ₂	d. tin(IV) sulfide	
HNO ₂	e. nitrous acid	
Write the Stock system non	es for the following compounds:	

2. Write the Stock system names for the following compounds:

_	magnesium perchlorate	a. $Mg(ClO_4)_2$
-	iron(II) nitrate	b. Fe(NO ₃) ₂
-	iron(III) nitrite	c. $Fe(NO_2)_3$
_	cobalt(II) oxide	d. CoO
_	nitrogen(V) oxide	e. dinitrogen pentoxide
3. 13 atoms a. How many		iny atoms are represented by the formula $Ca(HSO_4)_2$?
_	4.0 mol b. How many moles of oxygen atoms are in a 0.50 mol sample of compound?	
_	+ 6 c. Assign t	he oxidation number to sulfur in the HSO_4^- anion.

- **4.** Assign the oxidation number to the element specified in each of the following:
 - +1 **a.** hydrogen in H₂O₂
 - <u>-1</u> **b.** hydrogen in MgH₂
 - **____ c.** sulfur in S_8
 - <u>+4</u> **d.** carbon in $(CO_3)^{2-}$
 - <u>+6</u> e. chromium in $Na_2Cr_2O_7$
 - +4 **f.** nitrogen in NO₂

5	c, b, d, a	 Following are samples of four different compounds. Arrange them in order of increasing mass, from smallest to largest. 		
		a. 25 g of oxygen gasb. 1.00 mol of H₂O	c. 3×10^{23} molecules of C ₂ H ₆ d. 2×10^{23} molecules of C ₂ H ₆ O ₂	
6. _	NaOH 40.00 g/mol	 a. What is the formula for soc b. What is the formula mass of 	dium hydroxide? of sodium hydroxide?	
_	10. g	c. What is the mass in grams	of 0.25 mol of sodium hydroxide?	
7	80% C, 20% H	What is the percentage composed whole number?	sition of ethane gas, C_2H_6 , to the nearest	
8. _	С ₅ Н ₁₀ О5	— Ribose is an important sugar (150.15 g/mol. If its empirical f formula?	part of RNA),with a molar mass of formula is CH ₂ O, what is its molecular	

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MIXED REVIEW continued

MIXED REVIEW continued

9. Butane gas, C_4H_{10} , is often used as a fuel.

174 g a. What is the mass in grams of 3.00 mol of butane?

1.81 \times **10²⁴ molecules b.** How many molecules are present in that 3.00 mol sample?

 C_2H_5 c. What is the empirical formula of the gas?

 $C_{10}H_{8}$ 10. _____ _____ Naphthalene is a soft covalent solid that is often used in mothballs. Its molar mass is 128.18 g/mol and it contains 93.75% carbon and 6.25% hydrogen. Determine the molecular formula of napthalene from this information.

11. Nicotine has the formula $C_x H_v N_z$. To determine its composition, a sample is burned in excess oxygen, producing the following results:

1.0 mol of CO₂ 0.70 mol of H₂O 0.20 mol of NO₂

Assume that all the atoms in nicotine are present as products.

1.0 mol **a.** Determine the number of moles of carbon present in the products of this combustion.

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	<u> 1.40 mol</u>	b. Determ the con	nine the number of moles nbustion products.	of hydrogen present in	
	0.20 mol	c. Determ combu	nine the number of moles stion products.	of nitrogen present in the	
	C₅H ₇ N	d. Determ calcula	d. Determine the empirical formula of nicotine based on your calculations.		
	162 g/mol	e. In a separate experiment, the molar mass of nicotine is found to be somewhere between 150 and 180 g/mol. Calculate the molar mass of nicotine to the nearest gram.			
12.	2. When MgCO ₃ (<i>s</i>) is strongly heated, it p 52.2%		produces solid MgO as g a. What is the percent reaction occurs?	aseous CO_2 is driven off. tage loss in mass as this	
Mg is +2, C is +4, and O is -2 b. Assign the oxidation number to each atom in M			on number to each atom in $MgCO_3$.		
	No		c. Does the oxidation formation of CO_2 ?	number of carbon change upon the	

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