

REVIEW QUESTIONS

## Chapter 3

1. Using only a periodic table, assign charges for each ion below, then complete the table with formulas and names for compounds formed by the combination of each cation and anion.

	Ca ____	K ____	Al ____	NH <sub>4</sub> ____
S ____				
Cl ____				
N ____				
NO <sub>2</sub> ____				
SO <sub>4</sub> ____				
NO <sub>3</sub> ____				
CO <sub>3</sub> ____				
ClO <sub>3</sub> ____				
OH ____				
PO <sub>4</sub> ____				

2. Fill in the missing name or formula for each compound listed below. Fill in column 1 without using any notes, and then fill in column 2 with the use of notes.

	1	2
Barium nitrate		
Ferrous chloride		
Silver hydroxide		
Strontium phosphate		
Copper(II) acetate		
Zinc nitrite		
Potassium sulfite		
Ammonium carbonate		
Iodine heptafluoride		
Bromine trifluoride		
$\text{CuClO}_4$		
$\text{Ag}_2\text{SO}_4$		
$\text{N}_2\text{O}_5$		
$\text{Hg}_2\text{I}_2$		
$\text{PbO}_2$		
$\text{OF}_2$		

3. For each compound shown below, determine if the name or formula is incorrect, and write the correct form in the space provided:

- |                               |                      |       |
|-------------------------------|----------------------|-------|
| a) $\text{Ag}_2\text{S}$      | Disilver sulfide     | _____ |
| b) $\text{MgOH}$              | Magnesium hydroxide  | _____ |
| c) $\text{Ca}(\text{NO}_3)_2$ | Calcium (II) nitrate | _____ |
| d) $\text{SnO}_2$             | Tin (II) oxide       | _____ |
| e) $\text{PbS}$               | Lead sulfide         | _____ |
| f) $\text{ZnCl}_2$            | Zinc dichloride      | _____ |
| g) $\text{SO}_2$              | Sodium dioxide       | _____ |
| h) $\text{CaSO}_4$            | Calcium sulfide      | _____ |
| i) $\text{Ba}_2\text{O}$      | Barium oxide         | _____ |
| j) $\text{Cu}_2\text{O}$      | Copper (II) oxide    | _____ |

4. Balance the following equations by providing the missing coefficients:

- a)  $\text{___NH}_4\text{NO}_3 \rightarrow \text{___N}_2\text{O} + \text{___H}_2\text{O}$
- b)  $\text{___Mg}_3\text{N}_2 + \text{___H}_2\text{O} \rightarrow \text{___Mg}(\text{OH})_2 + \text{___NH}_3$
- c)  $\text{___NCl}_3 + \text{___H}_2\text{O} \rightarrow \text{___NH}_3 + \text{___HOCl}$
- d)  $\text{___C}_5\text{H}_{10}\text{O}_2 + \text{___O}_2 \rightarrow \text{___CO}_2 + \text{___H}_2\text{O}$
- e)  $\text{___}(\text{NH}_4)_2\text{Cr}_2\text{O}_7 \rightarrow \text{___N}_2 + \text{___Cr}_2\text{O}_3 + \text{___H}_2\text{O}$
- f)  $\text{___PCl}_5 + \text{___H}_2\text{O} \rightarrow \text{___H}_3\text{PO}_4 + \text{___HCl}$

5. Write a balanced equation for each reaction described below. Include state designations:
- a) When an aqueous solution of potassium dichromate is added to an aqueous solution of lead(II) nitrate, solid lead(II) dichromate and aqueous potassium nitrate are formed.
  
  
  
  
  
  
  
  
  
  
  - b) When chlorine gas is bubbled through an aqueous solution of potassium bromide, bromine gas and aqueous potassium chloride are formed.
  
  
  
  
  
  
  
  
  
  
  - c) When zinc metal is reacted with aqueous nitric acid, the reaction produces nitrogen gas, water and aqueous zinc nitrate.
6. What mass of chlorine is present in 12.2 g of  $\text{PbCl}_2$ ?
7. How many atoms of oxygen are present in 2.15 g of  $\text{Ca}_3(\text{PO}_4)_2$ ?

8. What is the percent composition of caffeine ( $C_8H_{10}N_4O_2$ )?

9. Determine the empirical formula for a compound with the following composition:

62.1% C

5.21% H

12.1% N

20.7% O

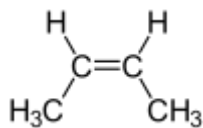
10. Combustion analysis of a 12.01-g sample of an unknown acid—which contains only carbon, hydrogen and oxygen—produced 14.08 g  $CO_2$  and 4.32 g  $H_2O$ . Determine the empirical formula for this acid.

11. A phosphorous compound that contains 34.00% phosphorus by mass has the formula  $X_3P_2$ . Identify the element X.

12. A 3.41-g sample of a hydrate of copper(II) chloride was heated to drive off the water of hydration. The anhydrous salt was found to have a mass of 2.69 g. Determine the formula for this hydrate.

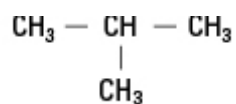
13. Classify each hydrocarbon below as alkane, alkene or alkyne, and write a molecular formula for each:

a)



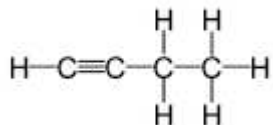
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c)



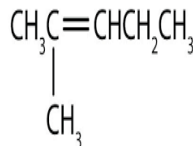
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b)



\_\_\_\_\_

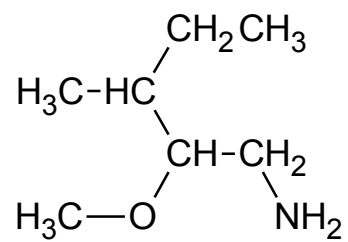
d)



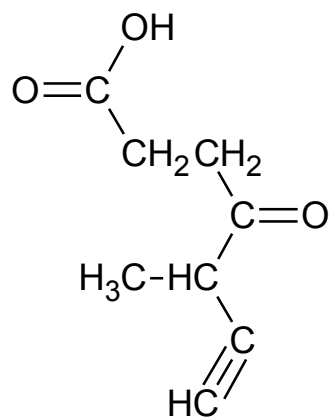
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14. Identify the functional groups present in the structures below:

a)



b)



c)

