

Chem 1014  
 In-Class Problem Set #7  
 InClass October 6, 1999  
 Fall 1999

Name \_\_\_\_\_

TA Name \_\_\_\_\_

Lab Section # \_\_\_\_\_

Here are some extra problems to practice on similar to those in ICPS7

1. How many protons and electrons in each of the following?

	Protons	Electrons
a) Er	<b>68</b>	<b>68</b>
b) $\text{Cu}^{2+}$	<b>29</b>	<b>27</b>
c) $\text{S}^{2-}$	<b>16</b>	<b>18</b>

2. How many protons, neutrons and electrons in each of the following?

	Protons	neutrons	electron
a) ${}_{22}^{48}\text{Ti}$	<b>22</b>	<b>26</b>	<b>22</b>
b) ${}_{28}^{60}\text{Ni}^{2+}$	<b>28</b>	<b>32</b>	<b>26</b>

3. Complete the following table.

Symbol	# protons	# neutrons	# electrons	charge
${}_{35}^{81}\text{Br}^{-1}$	<b>35</b>	<b>46</b>	<b>36</b>	<b>-1</b>
${}_{20}^{61}\text{Ca}^{2+}$	20	41	<b>18</b>	+2
${}_{55}^{132}\text{Cs}^{+}$	<b>55</b>	77	<b>54</b>	+1
${}_{20}^{127}\text{Te}^{2-}$	<b>52</b>	75	54	2-

4. Express each of the following as either a decimal number or in standard scientific notation.

a) 4,320 <b><math>4.32 \times 10^3</math></b>	b) $1.20 \times 10^4$ <b>12,000</b>
c) $7.99 \times 10^{-8}$ <b>0.0000000799</b>	d) 602,300,000,000,000,000,000 <b><math>6.023 \times 10^{23}</math></b>
e) 0.000000234 <b><math>2.34 \times 10^{-7}</math></b>	e) 13.13 <b><math>1.313 \times 10^1</math></b>

5. Perform the following operations and report your answer in exponential notation.

a)  $(1.78 \times 10^{-6})(4.01 \times 10^3) = \mathbf{7 \times 10^{-3}}$

b)  $(5.62 \times 10^{-5})(2.91 \times 10^8) = \mathbf{1.64 \times 10^4}$

c)  $\frac{2.39 \times 10^{-3}}{(7.26 \times 10^{-5})} = \mathbf{3.29 \times 10^1}$

d)  $\frac{8.45 \times 10^{-2}}{6.12} = \mathbf{1.4 \times 10^{-2}}$

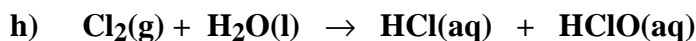
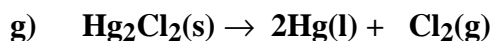
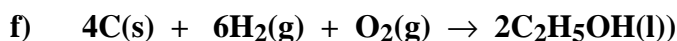
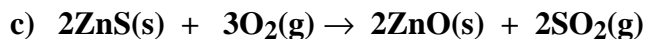
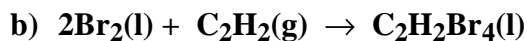
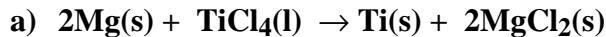
e)  $(1.31 \times 10^5) - (1.04 \times 10^4) = \mathbf{1.21 \times 10^5}$

f)  $(3.86 \times 10^{-3}) - (4.29 \times 10^{-2}) = \mathbf{-3.9 \times 10^{-2}}$

g)  $(4.25 \times 10^{-11}) + (2.56 \times 10^{-7}) = \mathbf{2.56 \times 10^{-7}}$

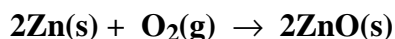
h)  $(7.33 \times 10^5) + (5.18 \times 10^4) = \mathbf{7.85 \times 10^5}$

6. Balance each of the following equations

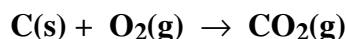


7. Write and balance the equation for each of the following

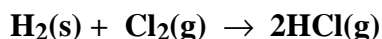
c) A formation equation for ZnO.



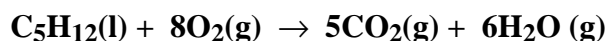
d) A formation equation for CO<sub>2</sub>.



e) A formation equation for HCl.



f) The reaction for the combustion of propane (C<sub>3</sub>H<sub>8</sub>).



8. Calculate the number of atoms in each of the following;

a) 1.00 g helium  
(note the mass of a helium atom  
is  $6.645 \times 10^{-24}$  g)

$$1.00 \text{ g He} \left( \frac{1 \text{ atom He}}{6.645 \times 10^{-24} \text{ g}} \right) \\ = 1.5 \times 10^{23} \text{ atoms H}$$

b) 17.0 g Na atoms  
(note the mass of a sodium atom  
is  $3.821 \times 10^{-23}$  g)

$$17 \text{ g Na} \left( \frac{1 \text{ atom Na}}{3.821 \times 10^{-23} \text{ g}} \right) \\ = 4.45 \times 10^{23} \text{ atoms O}$$

9. Calculate the number of atoms in each of the following; (Use Avogadro's number to solve these problems.)

a)  $2.73 \times 10^{-2}$  g carbon

$$2.73 \times 10^{-2} \text{ g C} \left( \frac{6.023 \times 10^{23} \text{ atom}}{12 \text{ g C}} \right) \\ = 1.37 \times 10^{21} \text{ atoms C}$$

b) 5.0397 g silicon

$$5.0397 \text{ g Si} \left( \frac{6.023 \times 10^{23} \text{ atom}}{28.1 \text{ g Si}} \right) \\ = 1.08 \times 10^{23} \text{ atoms Si}$$

c) 125 g gold

$$125 \text{ g C} \left( \frac{6.023 \times 10^{23} \text{ atom}}{197 \text{ g Au}} \right) \\ = 3.822 \times 10^{23} \text{ atoms Au}$$

d) 1.5 mol Mg

$$1.5 \text{ mol Mg} \left( \frac{6.023 \times 10^{23} \text{ atom}}{1 \text{ mol}} \right) \\ = 9.035 \times 10^{23} \text{ atoms Mg}$$

e)  $8.12 \times 10^2$  mol iron

$$8.12 \times 10^2 \text{ mol Fe} \left( \frac{6.023 \times 10^{23} \text{ atom}}{1 \text{ mol}} \right) \\ = 4.892 \times 10^{24} \text{ atoms Au}$$

f) 75 g Al

$$75 \text{ g Al} \left( \frac{6.023 \times 10^{23} \text{ atom}}{27 \text{ g Al}} \right) \\ = 1.67 \times 10^{24} \text{ atoms Al}$$

10. Calculate the mass in each of the following;

a)  $1.04 \times 10^3$  mol Kr

$$1.04 \times 10^3 \text{ mol Kr} \left( \frac{83.8 \text{ g}}{1 \text{ mol}} \right) \\ = 8.72 \times 10^4 \text{ g Kr}$$

b)  $5.92 \times 10^{22}$  atoms titanium

$$5.92 \times 10^{22} \text{ atom Al} \left( \frac{47.9 \text{ g Ti}}{6.023 \times 10^{23} \text{ atom}} \right) \\ = 4.708 \text{ g Ti}$$

c) 1.78 mol CO<sub>2</sub>

$$1.78 \text{ mol CO}_2 \left( \frac{44 \text{ g}}{1 \text{ mol}} \right) \\ = 78.3 \text{ g CO}_2$$

d) 0.0710 mol C<sub>2</sub>H<sub>6</sub>

$$0.0710 \text{ mol C}_2\text{H}_6 \left( \frac{30 \text{ g C}_2\text{H}_6}{1 \text{ mol}} \right) \\ = 2.13 \text{ g C}_2\text{H}_6$$