GENERAL CHEMISTRY I           QUIZ III
October 9, 2006

INSTRUCTIONS:
PRINT YOUR NAME ————> NAME ___________________.

WORK NUMBER 1
WORK 3 OF #1 THROUGH #4 (4@ 25)
SHOW YOUR WORK FOR PARTIAL CREDIT
USE THE CORRECT NUMBER OF SIGNIFICANT FIGURES
THE LAST TWO PAGES ARE A PERIODIC TABLE AND A SCRATCH SHEET

R = 0.08206 liter-atm/mol-K      1 ____.
R = 8.3145 J/mol-K               2 ____.
h = 6.626 × 10^{-34} J·s         3 ____.
c = 2.9979 × 10^8 m/s            4 ____.

TOTAL(75) ____.
1. Write a balanced chemical equation for the following descriptions. You must come up with the correct formulas for the compounds using the periodic table for monoatomic ions. I will give you the formula of acids.

   a) Sulfuric acid (H$_2$SO$_4$) reacts with potassium metal to form potassium sulfate and dihydrogen.

   b) Barium nitrate (Barium is Ba) reacts with sodium sulfate to form barium sulfate and sodium nitrate.

   c) Phosphorus pentachloride reacts with water to produce phosphoric acid (H$_3$PO$_4$) and hydrochloric acid (HCl).

   d) Iron(II)oxide reacts with dioxygen gas to produce iron(III)oxide.

2. A compound that is known to contain only phosphorus, oxygen, and chlorine is analyzed and found to have percent by mass composition of 20.20% phosphorus, 10.43% oxygen and 69.36% chlorine. What is the empirical formula of this compound?
3. Cytosine is one of the four bases that make up DNA. The formula of cytosine is \( \text{C}_4\text{H}_5\text{N}_3\text{O} \).

(a) What is the percent composition by mass of nitrogen in cytosine?

(b) 35.9 g of cytosine is how many moles of cytosine?

(c) How many individual molecules of cytosine are there in 35.9 g?

4. On the planet dynos the distribution of Arsenic (As) atoms is different than on earth. The natural abundances on dynos of the isotopes are shown below:

<table>
<thead>
<tr>
<th>Isotope</th>
<th>mass</th>
<th>abundance</th>
</tr>
</thead>
<tbody>
<tr>
<td>(^{73}\text{As})</td>
<td>72.923827 amu</td>
<td>12.84 %</td>
</tr>
<tr>
<td>(^{74}\text{As})</td>
<td>73.923827 amu</td>
<td>33.96 %</td>
</tr>
<tr>
<td>(^{75}\text{As})</td>
<td>74.921594 amu</td>
<td>53.20 %</td>
</tr>
</tbody>
</table>

(a) What is the primary isotope for As on earth? (see the periodic table)

(b) What is the average atomic mass for As on dynos?