CHM151 Quiz 1a  25 Pts  Fall 2005  Name: **Key**

**Show work to receive credit.** **Conversion factors:** centi (c) = $10^{-2}$, milli (m) = $10^{-3}$, micro (μ) = $10^{-6}$, nano (n) = $10^{-9}$, pico (p) = $10^{-12}$, kilo (k) = $10^{3}$, 2.54 cm = 1 inch, 12 inches = 1 ft, 5280 ft = 1 mile, 60 s = 1 min, 60 min = 1 hr.

1.  (2 Pts)  Which of the following is a chemical change?

   A.  boiling of water     B.  melting wax     (C.  broiling a steak on a grill)     D.  carving a piece of wood

   E.  condensing water vapor into rainfall

2.  (3 Pts) The distance between carbon atoms in ethylene is 134 picometers.  Express that distance in meters?

$$\frac{134 \, pm}{} \left| \frac{10^{-12}}{p} \right. = 134 \times 10^{-12} \, m$$
$$\text{or } 1.34 \times 10^{-10} \, m$$

3.  (4 Pts) The mass of a sample is 550 milligrams.  Express that mass in kilograms?

$$\frac{550 \, mg}{} \left| \frac{10^{-3}}{m} \right| \frac{k}{10^{3}} = 550 \times 10^{-6} \, kg$$
$$\text{or } 5.5 \times 10^{-4} \, kg$$

4.  (4 Pts) Which of the following represents the largest volume?  Show calculations to support your answer.

   A.  10,000 μL     $10000 \times 10^{-6} \, L = 1 \times 10^{-2} \, L$
   B.  1000 pL     $10^{3} \times 10^{-12} \, L = 10^{-9} \, L$
   (C.  100 mL)     $10^{2} \times 10^{-3} \, L = 10^{-1} \, L \Leftarrow$
   D.  10 nL     $10 \times 10^{-9} = 10^{-8} \, L$
   E.  10 cm$^3$     $10 \, mL = 10^{-3} \, L = 10^{-3} \, L$

5.  (4 Pts) An ore sample contains 0.37% gold and 1.25% silver.  How many mg of gold can be recovered from 14.0 kg of ore?

$$\frac{14 \times 10^{3} \, g \, ore}{} \left| \frac{0.37 \, Au}{100 \, ore} \right| \frac{m}{10^{-3}} = 51800 \, mg \, Au$$

6.  (4 Pts) The area of a 15-inch pizza is 176.7 in$^2$.  Express this area in square centimeters.

$$\frac{176.7 \, in^2}{} \left| \frac{2.54 \, cm}{1 \, in} \right| \frac{2.54 \, cm}{1 \, in} = 1139.99$$
$$1140 \quad cm^2$$

7.  (4 Pts) The speed needed to escape the pull of Earth's gravity is 11.3 km/s.  What is this speed in mi/h?

$$\frac{11.3 \times 10^{3} \, m}{s} \left| \frac{in}{2.54 \times 10^{-2} \, m} \right| \frac{1 \, ft}{12 \, in} \left| \frac{mi}{5280 \, ft} \right| \frac{3600 \, s}{hr} = 25277 \, \frac{mi}{hr}$$