NAME: _____

AP CHEMISTRY, DIMENSIONAL ANALYSIS: A

Calculate each of the following problems using the "Factor-Label Method" or dimensional analysis. Express your answer with the correct number of significant digits. Show **all** steps and conversions for maximum credit. 5 points each.

1. Convert 64 fluid ounces to deciliters (dL). $1oz = 29.573\ ml$

2. The density of mercury is 13.6 g/cm^3. Calculate the density of mercury in lbs/ft^3.

$1 inch^3 = 16.5\ cm^3$
$1 inch = 2.54\ cm$
$1\ lb = 0.454\ kg$
$1\ ml = 1\ cm^3$
$1\ ft^3 = 1728\ inch^3$

3. Calculate the number of molecules of oxygen which will occupy a 1.0 quart mayonnaise jar containing only air at STP. (NOTE: Air is 21% oxygen)

$1\ mole = 6.02 \times 10^{23}\ molecules$
$1\ mole\ gas = 22.4\ L\ @ STP$
$1\ Liter = 1.057\ quarts$

4. The maximum amount of mercury which is allowed in tuna fish by law is 0.75 ppm. Calculate the maximum mass of mercury in milligrams which can be found in a 7.00 ounce (av.) of tuna fish.

$1\ ppm = 1\ mg/Kg$
$1\ ounce = 28.35\ g$
$1\ can = 7.00\ ounce$

5. Calculate the amount of energy produced by the complete combustion of 1.00 m^3, measured at STP, of methane (formula mass = 16 g/mol). The heat of combustion of methane is 212.8 kcal/mol.

1 mole of methane produces = 212.8 Kcal