CHM 161-A   Name_____
Quiz 1 – 75pts (+ 10pt bonus)
September 9, 2008

Answer all questions in the spaces provided. On numerical problems, *show your work* (set up the problems dimensionally). Be careful to express answers to the *appropriate number of significant figures* and include units where appropriate. Point values are in parentheses.

1.(10) Identify the following as either elements (E), compounds (C) or mixtures (M):
         a) neon   E
         b) blood   M
         c) $C_{12}H_{22}O_{11}$ (sugar)   C
         d) brass   M

2.(10) Determine whether the following are physical (P) or chemical (C) changes:
         a) dissolving sugar into water   P
         b) conversion of water into hydrogen and oxygen   C
         c) steam condensing into droplets   P
         d) digestion of food   C

3.(10) Using the terms "shape" and "volume", and any combination of the modifiers "definite" and "indefinite", define (e.g. "definite shape, definite volume"):
         a gas – indefinite shape, indefinite volume

         a liquid – indefinite shape, definite volume

4.(15)   a) Express the number 5,523.6 to four significant figures using scientific notation.
              5.524×10^{3}

         b) Express 0.000 000 002 105 to two significant figures using scientific notation.
              2.1×10^{-9}

         c) If your answer in b) is in units of g, express it in units of mg (stay in scientific notation).
              2.1×10^{-9} g x $[10^{3}$ mg/g] = **2.1×10^{-6} mg**

5.(10) *Determine the density* of mercury (Hg) if 225.8 g occupies a volume of 16.6 mL. Show your work and be sure to include units.
              Density = mass/volume
                     = 225.8 g/16.6 mL
                     = **13.6 g/mL**

6.(10) A jumbo family size bottle of children's decongestant contains 1.69 pints. *What is this volume* in units of mL? Show your work.

1.69 pt x 1 qt/2 pt x 0.9464 L/1 qt x 1000 mL/1 L = **800 mL**

or   **8.00 x 10^2 mL**

(3 sig. figures)

7.(10) A premature baby weighs 1.12 kg. *How many ounces* (oz) does the infant weigh? Show your work.

1.12 kg x 2.205 lb/1kg x 16 oz/1lb = **39.5 oz**

(3 sig. figures)

Bonus

8.(10) Often, a lethal dose of a toxin is measured in g of toxin / kg body weight of a specific animal population. The dose that will be lethal for 50% of a population is called an LD$_{50}$. The dose of ethanol (grain alcohol) that is lethal for 50% of humans (the LD$_{50}$) is 1.70 g ethanol / kg body weight.

a) What is a lethal dose in g for 50% of those humans weighing 82.5 kg?

A lethal dose is 1.70 g for every kg body weight.

82.5 kg x 1.70g/1 kg = **140 g ethanol**

b) The density of ethanol is 0.80 g/mL. What is the lethal dose in mL?

Density = mass/volume solve for Volume

Volume = mass/density

Or set it up dimensionally

140 g   x 1 mL/0.80 g = **180 mL ethanol**

2 sig. figures

Conversion factors (you will not need all of these)

Length:

1 m = 39.37 in

1 in = 2.54 cm

1 mi = 1.609 km

Volume:

1 qt = 0.9464 L

1 qt = 2 pt (exact)

Mass:

1kg = 2.205 lb

1 oz = 28.35 g

1 lb = 16 oz (exact)

Density is units of mass per unit volume