AP Chemistry Chapter 1 Practice Problems - Key

1. Na = element NaCl = compound
   Sugar = compound C = element
   Gold = element
   gold chloride = compound

2. a. orange = physical
   b. turns to rust = chemical
   c. explode = chemical
   d. density = physical
   e. melts = physical
   f. green = physical

3. D = m/V
   = 23.5g / (52.2mL – 47.5mL)
   = 23.5g / 4.7mL = **5.0g/mL**

4. 2.1cm x 2.5cm = $5.25cm^2$ = $5.3cm^2$
$5.3cm^2$ ($1m^2$ / $10{,}000cm^2$) = $5.3x10^{-4}m^2$

5. a. (2.2 + 2.3 + 2.7 + 2.4) / 4 = **$2.4g/cm^3$**
   (2.703 +2.701 + 2.705 + 5.811) / 4 = **$3.480g/cm^3$** (with 5.811 data point)
   (2.703 + 2.701 + 2.705) / 3 = **$2.703g/cm^3$** (without 5.811 data point)
The 5.811 data point should probably be disregarded as it seems to be an erroneous value compared to the others.
   b. (2.702 – 2.4) / 2.702 = .112 or about 11% off
   (2.703 – 2.702) / 2.702 = $3.7x10^{-4}$ or about .04% off.
   c. Method B is more precise and also more accurate (if you drop the 5.811 value). Each value has 4 digits of precision compared to two and is only .04% off of the accepted value.

6. a. Qualitative = blue-green, solid
   Quantitative = $2.65g/cm^3$ and 2.5g
   b. Extensive = 2.5g
   Intensive = blue-green, solid, and $2.65g/cm^3$
   c. V = 2.5g / $2.65g/cm^3$ = $.94cm^3$

7. (0.50mL)(1.0g/mL)(.10)(1,000mg/1g) = **50.mg**

8. One could check for an odor, check the boiling or freezing point, or determine the density. If the density is approximately $1g/cm^3$ at room temperature, the liquid could be water. If it boils at about 100^oC and freezes about 0^oC, that would be consistent with water. To check for the presence of salt, boil the liquid away. If a substance remains, it could be a salt, but further testing would be required.

9. a. boiling the water away from the salt.
   b. use a magnet (attracted to iron but not lead)
   c. dissolve and filter (sulfur is mostly insoluble in water)

10. a. .0094392 = **$9.44x10^{-3}$**
   b. ($62.1x10^2 – 5.23x10^2$) = $56.9x10^2$ = **$5.69x10^3$**
   c. 11.8738… = **11.9**

11. The result of subtracting 2.3 from 23.56 will have 3 sig figs, however we won't officially round off until the end so you get .028619… = .0286 or **$2.86x10^{-2}$**

12. (1.50carat)(0.200g/carat)($1cm^3$/3.513g) = .085397… = **$8.54x10^{-2}cm^3$**

13. The aluminum in a package containing $75ft^2$ of kitchen foil weighs approximately 12 ounces. Aluminum has a density of $2.70g/cm^3$. What is the approximate thickness of the aluminum foil in millimeters? (1oz. = 28.4g)

($1cm^3$/2.70g)(28.4g/1oz)(12oz)($1in^2$/$6.4516cm^2$) ($1ft^2$/$144in^2$)(1/$75ft^2$)(10mm/1cm) = **$1.8x10^{-2}$mm**

14. ^oC = (122^oF – 32)5/9 = **$50.^oC$**

15. The result would be 12.108g – 12.024g = **.084g** You can see because of the rules of addition/subtraction, even though each measurement had 5 significant digits, the final answer only contains **2 significant digits**.