ANSWERS TO TOPIC A PROBLEMS

Some notes about our class solution keys (this and all future keys):

1) For most problems, there is more than one way to set up the solution, and my full solution key usually shows just one possible solution method. ***You never need to use the same method to solve the problem that I do – any method that is chemically valid is fine with me.*** *If you use a different method from mine, but you get the correct answer, your method is probably correct (although you're welcome to check with me, just to be sure). If you use a different method and get a different answer, let me look over your solution, to see whether your method is valid – you might have just made an arithmetic error.*

2) In all calculations, I keep more digits than required by the significant figure rules, and round to the correct number of sig figs at the end. It is always best to keep extra digits throughout the calculations, to avoid rounding errors. If you get an answer that is slightly different from mine (±1 in the last sig fig), it's probably just a rounding error.

3) I try to be very careful as I write answer keys, but I am not perfect. If you find an error in a solution key, tell me about it – everyone will be grateful.

1) a) $2x$ mol
b) $8x$ mol
c) $(1.2044 \times 10^{24})x$ atoms
d) $262.87x$ g
e) $72.93x$ g Mg

2) a) $0.0038171x$ mol
b) $0.026720x$ mol
c) $0.42751x$ g
d) $(1.6091 \times 10^{22})\ x$ atoms

3) $4.5x$ atoms

4) a) **Box 1 contains more atoms**.
b) **The two boxes contain equal numbers of atoms.**

5) **Box 1 contains more molecules**.

6) **The element is platinum**.

7) **$C_3H_6Cl_2$**.

8) **The empirical formula is B_3H_5** (or H_5B_3).
9) **the molecular formula is B_6H_{10}** (or $H_{10}B_6$).

10) T**he group 2A element is barium**.

11) **$C_8H_4O_5$**

12) 16.28 g

13) a) $5x$ mol H_2O
b) $6.5x$ mol O_2

14) a) **F_2 is the limiting reactant.**
b) **41.87 g of NF_3**
c) **1.74 g of N_2**.
d) The ICE table will look like this (rounding all values to four decimal places):

	N_2	+	3 F_2	→	2 NF_3
Initial	0.3569 mol		0.8845 mol		0 mol
Change	– 0.2948 mol		– 0.8845 mol		+ 0.5896 mol
End	0.0621 mol		0 mol		0.5896 mol

15) **62.39 g,** 89.94%

16) **17.0 g of $MgCl_2$**.

17) **9.1 mL**

18) a) **1.286 moles of C_2H_6, no O_2, 7.429 moles of CO_2, and 11.143 moles of H_2O**
b) **29.19 g of C_2H_6, 152.93 g of CO_2, and 93.91 g of H_2O**
c) **0.502 moles of C_2H_6**.

19) a) **no NH_3, y – 0.75x moles of O_2, 0.5x moles of N_2, and 1.5x moles of H_2O**.
b) **x – 1.333y moles of NH_3, no O_2, 0.667y moles of N_2, and 2y moles of H_2O**.
(Expressions like $x - {}^4/_3 y$ are also acceptable.)
c) ***x* = 0.8*y*** (Any equivalent equation is okay, such as $y = 1.25x$, $x/y = 0.8$, etc.)

20) 1.209x g

21) 44.4% Al, 55.6% Cu

22) 37.90% $AgNO_3$, 62.10% KNO_3

23) **14.841 g of SO_2 and 43.882 g of SO_3**.