Mole WS #2 **Name:**_____ **Block:**_____

#1-4: Write the formula and calculate molar mass.

1. Chlorine Cl_2

$35.45(2) = 70.90$ g/mol

2. Ammonium acetate $NH_4C_2H_3O_2$

$14.01 + 1.01(4) + 12.01(2) + 1.01(3) + 16(2)$

77.1 g/mol

3. Aluminum sulfate $Al_2(SO_4)_3$

$26.98(2) + 32.07(3) + 16(12)$

342.17 g/mol

4. Carbonic acid H_2CO_3

$1.01(2) + 12.01 + 16(3) = 62.03$ g/mol

5. Determine the number in the number of moles (want) in 25.00g (4 sig figs) of chlorine gas (given). (use the molar mass from # 1)

$$25\text{ g } Cl_2 \left| \frac{1\text{ mol } Cl_2}{70.9\text{ g } Cl_2} \right. = 0.3526\text{ mol } Cl_2$$

4 sig figs

6. How many particles (want) are in 15 moles (given) of sodium chloride? NaCl (2 sig figs)

$$15\text{ mol NaCl} \left| \frac{6.02 \times 10^{23}\text{ particles NaCl}}{1\text{ mol NaCl}} \right. = 9.0 \times 10^{24}\text{ particles NaCl}$$

2 sig figs

7. Determine the number of grams in 3.2×10^{23} particles of carbonic acid (use the molar mass from # 4)

2 sig figs

want: grams — given: 3.2×10^{23} particles

$$\frac{3.2 \times 10^{23} \text{ particles } H_2CO_3 \mid 1 \text{ mol } H_2CO_3}{6.02 \times 10^{23} \text{ particles } H_2CO_3} = 0.53156 \text{ mol } H_2CO_3$$

$$\frac{0.53156 \text{ mol } H_2CO_3 \mid 62.03 \text{ g } H_2CO_3}{1 \text{ mol } H_2CO_3} = \boxed{33 \text{ g } H_2CO_3}$$

2 sig figs

OR ONE GRID →

$$\frac{3.2 \times 10^{23} \text{ particles } H_2CO_3 \mid 1 \text{ mol } H_2CO_3 \mid 62.03 \text{ g } H_2CO_3}{6.02 \times 10^{23} \text{ particles } H_2CO_3 \mid 1 \text{ mol } H_2CO_3} = \boxed{33 \text{ g } H_2CO_3}$$

8. How much space in liters will 0.0750 mole of nitrogen gas take up at STP?

3 sig figs — N_2 = diatomic !

want: liters — given: 0.0750 mole of nitrogen gas

$$\frac{0.0750 \text{ mol } N_2 \mid 22.4 \text{ L } N_2}{1 \text{ mol } N_2} = \boxed{1.68 \text{ L } N_2}$$

3 sig figs

9. 60.00 grams of carbon dioxide will take up how much space in liters at STP?

4 sig figs

given: 60.00 grams of carbon dioxide — want: liters

$$\frac{60 \text{ g } CO_2 \mid 1 \text{ mol } CO_2}{44.01 \text{ g } CO_2} = 1.3633 \text{ mol } CO_2$$

$$\frac{1.3633 \text{ mol } CO_2 \mid 22.4 \text{ L } CO_2}{1 \text{ mol } CO_2} = \boxed{30.54 \text{ L } CO_2}$$

4 sig figs

OR ONE GRID →

$$\frac{60 \text{ g } CO_2 \mid 1 \text{ mol } CO_2 \mid 22.4 \text{ L } CO_2}{44.01 \text{ g } CO_2 \mid 1 \text{ mol } CO_2} = \boxed{30.54 \text{ L } CO_2}$$