Chemistry CP
Stoichiometry Quiz

Name: Key

1. Define Stoichiometry. (1 point)
   using a balanced equation to calculate relative masses of reactants and products for a reaction
2. What are the conditions of STP? (2 points)
   0°C + 1atm
3. What is the molar volume of a gas at STP? (2 points)
   22.4 liters = 1mole
4. According to the following balanced equation, $6\ CO_2 + 6\ H_2O \rightarrow C_6H_{12}O_6 + 6\ O_2$, how many **grams** of glucose ($C_6H_{12}O_6$) can be produced from the reaction of 20.9 **liters** of carbon dioxide gas (CO_2)at 35°C and 1.03 atm of pressure? (7 Points)

$\frac{(1.03)(20.9)}{(0.0821)(308)} = n = 0.8513\ mol\ CO_2 \left/ \frac{1\ mol\ C_6H_{12}O_6}{6\ mol\ CO_2} \right. = 0.14189\ mol\ C_6H_{12}O_6$

$0.14189\ mol \left/ \frac{180\ g}{1\ mol} \right. = 25.54\ g\ C_6H_{12}O_6$

5. Using this balanced equation, $Mg_3N_2 + 3\ H_2O \rightarrow 3\ MgO + 2NH_3$, how many **liters** of ammonia gas (NH_3) at at 25°C and 1.5 atm of pressure can be produced from 1.89 **liters** of water (H_2O) gas STP? (8 Points)

$\frac{(1)(1.89)}{(0.0821)(273)} = n = 0.08432\ mol\ H_2O \left/ \frac{2\ mol\ NH_3}{3\ mol\ H_2O} \right. = 0.05622\ mol\ NH_3$

$\frac{(.05622)(0.0821)(298)}{1.5} = 0.9169\ L\ NH_3$

Atomic and Molar Masses You MAY need for the above problems

$C_6H_{12}O_6$: 180 g = 1 mole CO_2: 44.00 g = 1 mole
NH_3: 17 g = 1 mole H_2O: 18 g = 1 mole

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6. According to the following balanced equation, 6 CO_2 + 6 H_2O → $C_6H_{12}O_6$ + 6 O_2, how many **grams** of glucose ($C_6H_{12}O_6$) can be produced from the reaction of 15.2 **liters** of water gas (H_2O)at 15°C and 3.03 atm of pressure? (7 Points)

$\frac{(3.03)(15.2)}{(0.0821)(288)} = n = \frac{1.948 \text{ mol } H_2O \,/\, 1 \text{ mol } C_6H_{12}O_6}{6 \text{ mol } H_2O} = .3246 \text{ mol } C_6H_{12}O_6$

$\frac{.3246 \text{ mol } C_6H_{12}O_6 \,/\, 180 \text{ g}}{1 \text{ mol}} = 58.43 \text{ g } C_6H_{12}O_6$

7. Using this balanced equation, Mg_3N_2+ 3 H_2O → 3 MgO + 2NH_3, how many **liters** of ammonia gas (NH_3) at at 0°C and 1.5 atm of pressure can be produced from 115.5 **grams** of water (H_2O)? (8 Points)

$\frac{115.5 \text{ g } H_2O \,/\, 1 \text{ mol}}{18 \text{ g}} = \frac{6.41667 \text{ mol } H_2O \,/\, 2 \text{ mol } NH_3}{3 \text{ mol } H_2O} = 4.278 \text{ mol } NH_3$

$\frac{(4.278)(.0821)(273)}{1.5} = 63.92 \text{ L } NH_3$

Atomic and Molar Masses You MAY need for the above problems

$C_6H_{12}O_6$: 180 g = 1 mole
CO_2: 44.00 g = 1 mole
NH_3 : 17 g = 1 mole
H_2O: 18 g = 1 mole