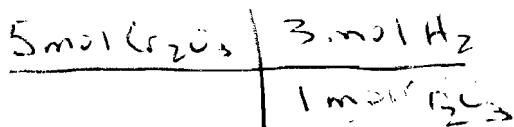
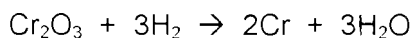


### Unit 4 Benchmark #3 – Stoichiometry – PRACTICE

Each question will be worth 4 points. You must show all of your work.

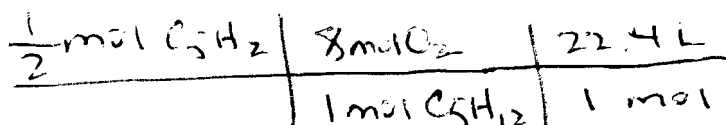
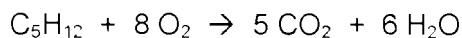
Put your answer in the space provided! No Work = No Credit!

1. A chemist uses hot hydrogen gas to convert chromium(III) oxide to pure chromium. How many moles of hydrogen are need to convert 5 moles of chromium(III) oxide,  $\text{Cr}_2\text{O}_3$ ?



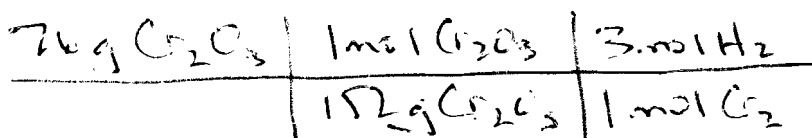
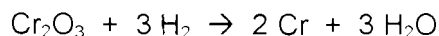
15 moles

2. How many liters of oxygen,  $\text{O}_2$ , are required for the complete combustion of  $\frac{1}{2}$  mole of pentane,  $\text{C}_5\text{H}_{12}$  at standard conditions?



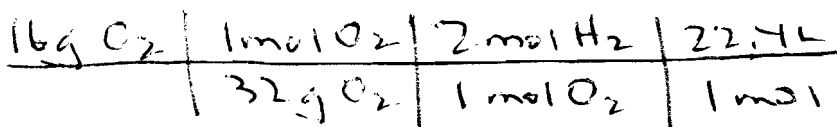
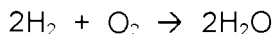
89.6 liters

3. A chemist uses hot hydrogen gas to convert chromium(III) oxide to pure chromium. How many moles of hydrogen are need to convert 76 grams of chromium(III) oxide,  $\text{Cr}_2\text{O}_3$ ?



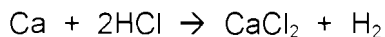
$\frac{3}{2}$  moles

4. Hydrogen can react explosively with oxygen to form water. How many liters of hydrogen are required to combine with 16 grams of oxygen at standard conditions?



22.4 liters

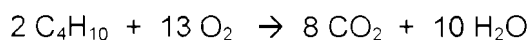
5. How many grams of calcium are required to free 4 moles of hydrogen gas from hydrochloric acid, HCl?



$$\frac{4 \text{ mol H}_2}{1 \text{ mol H}_2} \times \frac{1 \text{ mol Ca}}{1 \text{ mol Ca}} \times \frac{40 \text{ g Ca}}{1 \text{ mol Ca}}$$

160 grams

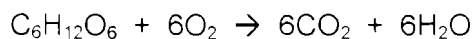
6. Butane,  $\text{C}_4\text{H}_{10}$  burns in oxygen. How many liters of water vapor,  $\text{H}_2\text{O}$ , are produced by the combustion of 20 moles of butane at standard conditions?



$$\frac{20 \text{ mol C}_4\text{H}_{10}}{2 \text{ mol C}_4\text{H}_{10}} \times \frac{10 \text{ mol H}_2\text{O}}{1 \text{ mol H}_2\text{O}} \times \frac{22.4 \text{ L}}{1 \text{ mol}}$$

2240 liters

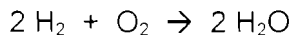
7. How many liters of oxygen, at standard conditions, are needed to react with 90 grams of glucose, ( $\text{C}_6\text{H}_{12}\text{O}_6$ )?



$$\frac{90 \text{ g C}_6\text{H}_{12}\text{O}_6}{180 \text{ g C}_6\text{H}_{12}\text{O}_6} \times \frac{1 \text{ mol C}_6\text{H}_{12}\text{O}_6}{1 \text{ mol C}_6\text{H}_{12}\text{O}_6} \times \frac{6 \text{ mol O}_2}{1 \text{ mol O}_2} \times \frac{22.4 \text{ L}}{1 \text{ mol}}$$

67.2 liters

8. How many grams of oxygen are required to produce 9 grams of water at standard conditions?



$$\frac{9 \text{ g H}_2\text{O}}{18 \text{ g H}_2\text{O}} \times \frac{1 \text{ mol H}_2\text{O}}{2 \text{ mol H}_2\text{O}} \times \frac{1 \text{ mol O}_2}{1 \text{ mol O}_2} \times \frac{32 \text{ g O}_2}{1 \text{ mol O}_2}$$

8 grams