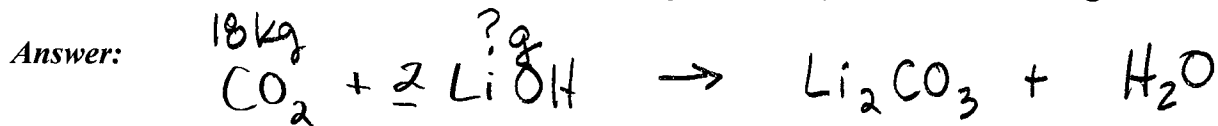


STOICHIOMETRY - LECTURE NOTES

Homework Answers (solutions to the homework) (the 3's) - Craig

EXAMPLE #5:

One way to remove CO_2 from air that must be recirculated (such as in a spacecraft cabin) is to react it with LiOH to form Li_2CO_3 and water. How many grams of LiOH are needed for a 6.0 day, 3 person, mission - if in one day, a person exhales about 1.0 kg of CO_2 ? (answer: 2.0×10^4 grams of LiOH)

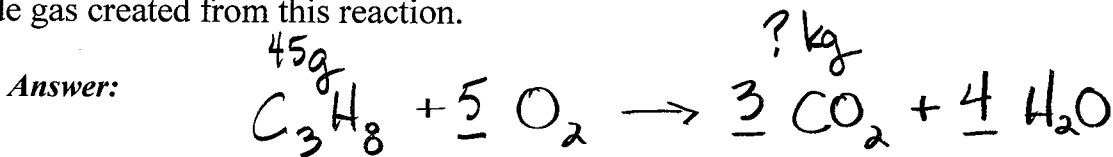


6 DAY	3 PEOPLE	1.0 kg	= 18 kg CO_2	<div style="border: 1px solid black; padding: 5px; display: inline-block;"> LiOH 19.6g ← </div>
	DAY	1 PERSON		

18 kg CO_2		1000g		1 mol CO_2		2 mol LiOH		6.94g + 16g + 1.008g
		1 kg		12.01g + 2(16g)		1 mol CO_2		1 mol LiOH

EXAMPLE #6:

In combustion reaction where 45 grams of propane gas, C_3H_8 , reacts with oxygen gas to produce the products of a combustion reaction (with a hydrocarbon). Calculate the mass (in kilograms) of carbon dioxide gas created from this reaction.

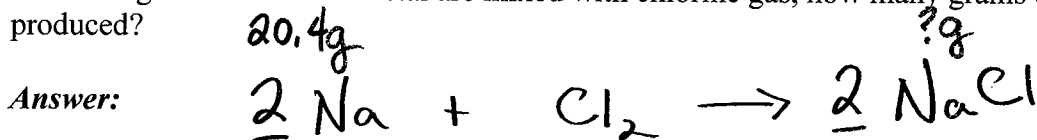


45g C_3H_8		1 mol C_3H_8		3 mol CO_2		12.01g + 2(16g)		11g	=
		3(12.01g) + 8(1.008g)		1 mol C_3H_8		1 mol CO_2		1000g	

0.135 kg CO_2

HOMEWORK PROBLEMS :

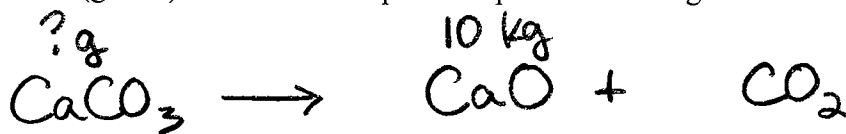
3a.) When 20.4 grams of sodium metal are mixed with chlorine gas, how many grams of sodium chloride are produced?



20.4g Na		1 mol Na		2 mol NaCl		22.99g + 35.45g	=	<div style="border: 1px solid black; padding: 5px; display: inline-block;">51.9 g NaCl</div>
		22.99g		2 mol Na		1 mol NaCl		

3b.) Limestone, calcium carbonate, CaCO_3 (s), is heated to produce lime, calcium oxide, CaO (s), and carbon dioxide gas. How much (grams) limestone is required to produce 10.0 kg of lime?

Answer:

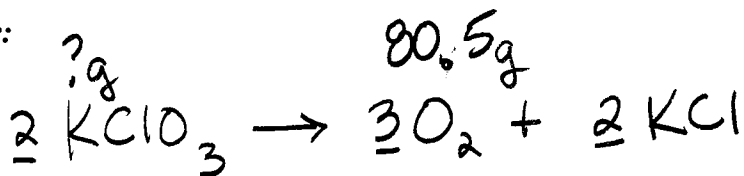


10 kg CaO	$\frac{1000\text{ g}}{1\text{ kg}}$	$\frac{1\text{ mol CaO}}{40.08\text{g} + 16\text{g}}$	$\frac{1\text{ mol CaCO}_3}{1\text{ mol CaO}}$	$\frac{40.08\text{g} + 12.01\text{g} + 3(16\text{g})}{1\text{ mol CaCO}_3} =$
--------------------	-------------------------------------	---	--	---

$$1.78 \times 10^4\text{ g CaCO}_3$$

3c.) In the decomposition of potassium chlorate, KClO_3 , 80.5 grams of oxygen gas forms. How many grams of potassium chlorate were present when the reaction started? Also, potassium chloride is produced.

Answer:



80.5 g O_2	$\frac{1\text{ mol O}_2}{2(16\text{g})}$	$\frac{2\text{ mol KClO}_3}{3\text{ mol O}_2}$	$\frac{39.1\text{g} + 35.45\text{g} + 3(16\text{g})}{1\text{ mol KClO}_3} =$
---------------------	--	--	--

$$206\text{ g KClO}_3$$