

Reactions

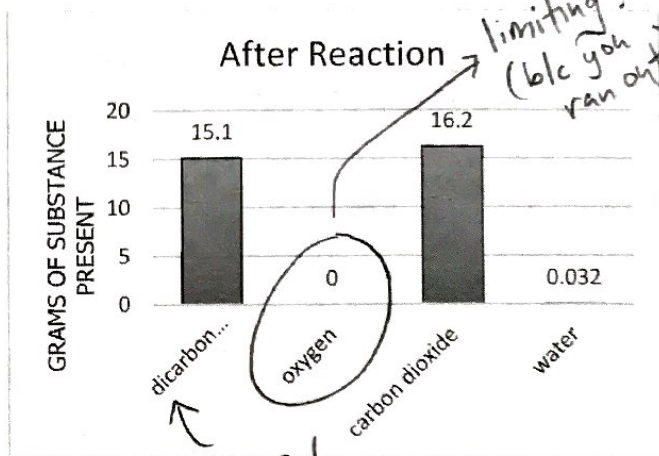
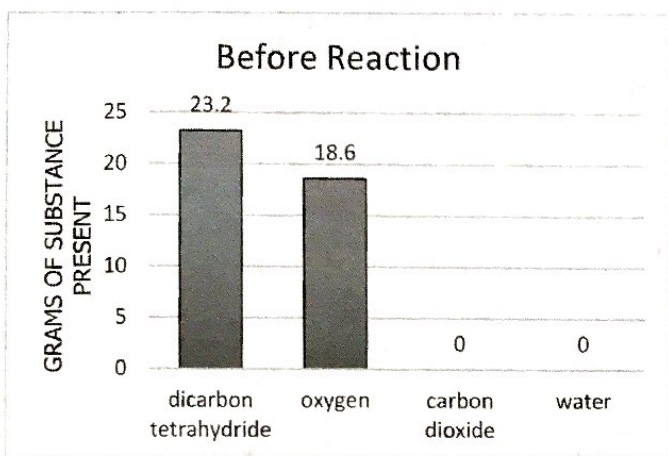
Unit 8

Practice Free Response 2

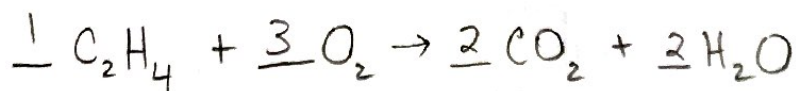
Directions: The suggested time is about 15 minutes for answering the constructed response section of the chemistry test. The parts within a question may not have equal weight. For calculations, show all your work in the spaces provided after each part. Pay particular attention to the proper use of units. Be sure your final answer is rounded to the correct number of significant figures. Make sure your work is legible. Illegible work will receive a grade of zero.

Question 1 [4 POINTS]

In a lab experiment, Skylar completes the combustion of 23.2 g of dicarbon tetrahydride in the presence of 18.6 g of oxygen. Her data can be seen in the graphs below.



A. Write and balance the equation for this reaction. [3 POINTS]



B. Which substance is the limiting reactant? How do you know? [2 POINTS]

O_2 is limiting, b/c (according to the graph) none is left over after the rxn stops!

C. Which substance is the excess reactant? How do you know? [2 POINTS]

C_2H_4 is in excess, b/c (according to the graph) some is left over after the rxn stops!

D. What is the theoretical yield, in grams, of carbon dioxide for Skylar's experiment? [1 POINT]

$$18.6 \text{ g O}_2 \times \frac{1 \text{ mol O}_2}{32.00 \text{ g O}_2} \times \frac{2 \text{ mol CO}_2}{3 \text{ mol O}_2} \times \frac{44.01 \text{ g CO}_2}{1 \text{ mol CO}_2} = \boxed{17.1 \text{ g CO}_2}$$

E. Skylar's twin, Ella, tries to replicate Skylar's reaction of 23.2 g of dicarbon tetrahydride with 18.6 g of oxygen. However, when Ella does it, only 0.21 moles of carbon dioxide are formed. What is Ella's percent yield? [2 POINTS]

$$\% \text{ Yield} = \frac{0.21}{0.388} \times 100 = \boxed{54\%}$$

OR:
$$0.21 \text{ mol CO}_2 \times \frac{44.01 \text{ g CO}_2}{1 \text{ mol CO}_2} = 9.2 \text{ g CO}_2$$

$$\% \text{ Yield} = \frac{9.2 \text{ g}}{17.1 \text{ g}} \times 100 = \boxed{54\%}$$