

Vasquez High School -- Chemistry -- Quest #6 -- Sections 9.1-9.2 -- 50 points

Read each problem carefully. Label everything. Show all work for full credit. Be neat and complete.
Ten points apiece on these unless specified otherwise.

1) A hydrocarbon, pentene, C_5H_{10} , burns completely in oxygen.

a) Balance the chemical equation for this reaction.

b) How many moles of oxygen would be needed here to produce 60 moles of carbon dioxide?

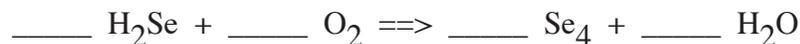
c) How many grams of water would you produce if you burned 1400 grams of pentene?

2) Consider the reaction between potassium and bromine gas, Br_2 . There is only one product possible.

a) Balance the chemical equation for this reaction.

b) How many grams of bromine would be needed to make 3.62×10^{-4} grams potassium bromide?

3) Next we wish to remove the hydrogen selenide from a sample of natural gas by forcing it to react with oxygen gas under pressure...here's the recipe:



a) Balance this reaction.

b) If I had to remove 386.5 grams of hydrogen selenide from my sample, how much selenium would be produced?

4) As a budding chemist maybe the crowning achievement of your semi-illustrious career was to produce the 50.0 kg of nitrous oxide, N_2O (laughing gas), needed for the governor's re-election party of 2042. Merely by thermally decomposing ammonium nitrate (NH_4NO_3), you produced it and water vapor, and gave everyone the laugh of a lifetime. You couldn't remember right now, but how much of the ammonium nitrate did you need?

5) You are the staff chemist on the Mars colony Ganglion in the year 2037. You have been asked to analyze and supervise the purification of thorium metal from its oxide, ThO_3 . By heating it with hot hydrogen gas, you can produce the raw metal and water vapor as a by-product.

a) Balance the chemical equation for the reaction.

b) If the mines you oversaw brought up 6.18×10^4 kg of oxide, how many moles of oxide is that?

c) How many grams of water vapor would be produced if all the oxide was converted to thorium metal?