PRACTICE #3 WHAT IS YOUR WEAKEST LINK? AP CHEMISTRY

We have all heard the old cliché that a chain is only as strong as its weakest link. This is a contingency exercise, meaning that the answers from previously answered problems are used in the remaining questions. Where will you get stuck? What is your weakest link? Try these problems and find out where you need assistance!

1. What is the empirical formula for a compound with the following % (by mass) composition?: 56.36% O, 43.64% P _____

2. What is the molecular formula if the molar mass is 283.90 g/mol? (What is the formal name of this chemical?) _____

3. Balance the following equation ___ _____ + ___ H_2O ➔ ___ H_3PO_4
ans from #2

4. If you have 1.6 mol H_2O and an excess of_____(from #2), how much H_3PO_4 will you make in moles?

5. If you have 17.8g of _____(from #2), how much H_2O in grams will you need to complete the reaction?

6. How many molecules do you have in 1.8g of _____(from #2)? How many atoms do you have?

7. If you have 8g of _____(from #2) and 10g of H_2O, how many grams of H_3PO_4 will you be able to make?

8. How much excess reagent will you have? (in grams)

9. Looking at the compound, H_3PO_4, What % by mass is oxygen?

10. Let's say you performed the reaction in #7 and measured 10g of H_3PO_4 at the end. Calculate a % yield.

11. Calculate the average atomic mass for Phosphorus. P's two isotopes are ^{30}P (29.9986 amu) and ^{32}P (32.9776 amu). They are 67.39% and 32.61% abundant, respectively.

12. If you have 4.0 moles each of _____ (from #2) and H_2O, what will be found in the product mixture at the end, in moles?

WEAKEST LINK ANSWERS:

1. O_5P_2 2. $O_{10}P_4$ 3. Coefficients 1, 6, and 4 respectively

4. 1.1 moles 5. 6.78 grams of water 6. 3.8×10^{21} molecules or 5.3×10^{22} atoms

7. 0.113v mol H_3PO_4 8. 6.95 grams water remaining 9. 65.3%

10. 90.1% 11. 30.97 amu 12. 3.3 moles $O_{10}P_4$ remaining, 2.7 moles H_3PO_4 (product)