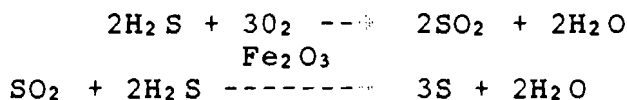


Chemistry, 3e

Name _____ Date _____ Section _____

1. What is the molecular weight of crotonaldehyde (C_4H_6O)?
2. A sample of copper weighing 6.93 g contains how many moles of copper atoms?
3. What is the percent by mass of bromine in ammonium perbromate? (The perbromate ion is BrO_4^- .)
4. A 2.00-g sample of an oxide of bromine is converted to 2.936 g of AgBr. Calculate the empirical formula of the oxide. (Mol. wt. for AgBr = 187.78)

5. The Claus reactions, shown below, are used to generate elemental sulfur from hydrogen sulfide.



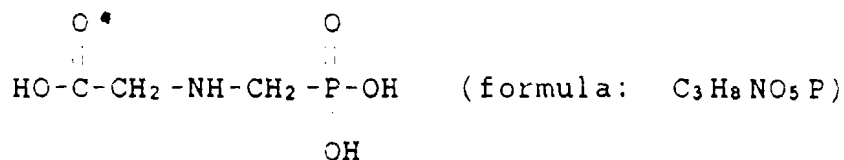
How much sulfur (in grams) is produced from 48.0 grams of O_2 ?

6. $wPCl_5 + xH_2O \rightarrow yPOCl_3 + zHCl$

Balance the above equation

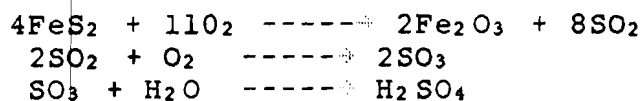
7. How many moles of oxygen are necessary to burn 2.0 moles of benzene, C_6H_6 , to carbon dioxide and water?

8. Roundup, a herbicide manufactured by Monsanto, has the structure



How many moles of molecules are there in a 500.-g sample of Roundup?

9. Phenol is a compound which contains 76.57% carbon, 6.43% hydrogen, and 17.0% oxygen. The empirical formula of phenol is
10. The molecular weight of an insecticide, dibromoethane, is 187.9. Its molecular formula is $\text{C}_2\text{H}_4\text{Br}_2$. What percent by mass of bromine does dibromoethane contain?
- ★ 11. A 15-g sample of lithium is reacted with 15 g of fluorine to form lithium fluoride: $2\text{Li} + \text{F}_2 \rightarrow 2\text{LiF}$
- After the reaction is complete, what will be present?
12. How many molecules of oxygen are required in the balanced equation showing the complete combustion of propane, C_3H_8 , to produce CO_2 and H_2O ?
13. Sulfuric acid may be produced by the following process:



How many moles of H_2SO_4 will be produced from 5.00 moles of FeS_2 ?

14. The empirical formula of styrene is CH; its formula weight is 104.1. What is the molecular formula of styrene?
15. Indium reacts with chlorine to form InCl_3 . In the balanced equation for this reaction, the coefficient of the indium trichloride is
16. Balance the following equation:

$$\text{Al}_2(\text{CO}_3)_3 + \text{HCl} \rightarrow \text{AlCl}_3 + \text{CO}_2 + \text{H}_2\text{O}$$
17. The refining of aluminum from bauxite ore (which contains 50.% Al_2O_3 by mass) proceeds by the overall reaction $2\text{Al}_2\text{O}_3 + 3\text{C} \rightarrow 4\text{Al} + 3\text{CO}_2$. How much bauxite ore is required to give the 5.0×10^{13} g of aluminum produced each year in the United States? (Assume 100% conversion.)

★ ~~18.~~

Naturally occurring iron contains 5.82% ^{54}Fe , 91.66% ^{56}Fe , 2.19% ^{57}Fe , and 0.33% ^{58}Fe . The respective atomic masses are 53.940 amu, 55.935 amu, 56.935 amu, and 57.933 amu. Calculate the average atomic mass of iron.

19. Vitamin C contains the elements C, H and O. It is known to contain 40.9% C and 4.58% H by mass. The molecular weight of Vitamin C has been found to be about 180. The molecular formula for Vitamin C is:

20. Consider the fermentation reaction of glucose:



A 1.00-mole sample of $\text{C}_6\text{H}_{12}\text{O}_6$ was placed in a vat with 100 g of yeast. If 46 grams of $\text{C}_2\text{H}_5\text{OH}$ was obtained, what was the percent yield of $\text{C}_2\text{H}_5\text{OH}$?

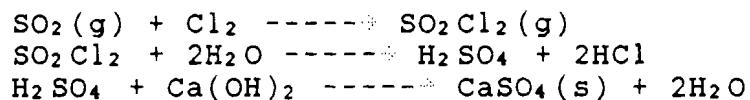
21. Phosphoric acid can be prepared by reaction of sulfuric acid with "phosphate rock" according to the equation:



Suppose the reaction is carried out starting with 103 g of $\text{Ca}_3(\text{PO}_4)_2$ and 75.0 g of H_2SO_4 . Which substance is the limiting reactant?

- ★ 22. When the equation $\text{C}_4\text{H}_{10} + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$ is balanced with the smallest set of integers, the balanced equation is?

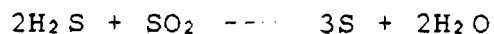
23. One commercial system removes SO_2 emissions from smoke at 95.0°C by the following set of balanced reactions:



Assuming the process is 95.0% efficient, how many grams of CaSO_4 may be produced from 1.00×10^2 grams of SO_2 ? (MW of SO_2 = 64.1 g/mole; MW of CaSO_4 = 136 g/mole)

24. The characteristic odor of pineapple is due to ethyl butyrate, a compound containing carbon, hydrogen, and oxygen. Combustion of 2.78 g of ethyl butyrate leads to formation of 6.32 g of CO_2 and 2.58 g of H_2O . The properties of the compound suggest that the molecular weight should be between 100 and 150. What is the molecular formula?

25. SO_2 reacts with H_2S as follows:



When 7.50 g of H_2S react with 12.75 g of SO_2 , How many grams of sulfur are produced?

26. Balanced the equation for the neutralization of phosphoric acid with calcium hydroxide.