

1. What would be the mass of 3.24 mol strontium nitrate? _____

2. How many molecules are contained in 15.63 g of C_5H_{12} ?

Ans: _____

How many C-atoms are contained in 15.63 g of C_5H_{12} ?

Ans: _____

3. What mass of sodium sulfate would contain 15.6 g of sodium?

Ans: _____

4. What is the percent carbon in aluminum oxalate?

Ans: _____

5. How many grams of CO_2 can be formed by the complete combustion of a 14.7 g sample of C_2H_6 that is 92.4% pure? (Assume the impurities contain no carbon.)

Ans: _____

6. What mass of Fe_3O_4 would contain 1.85×10^{21} atoms of Fe?

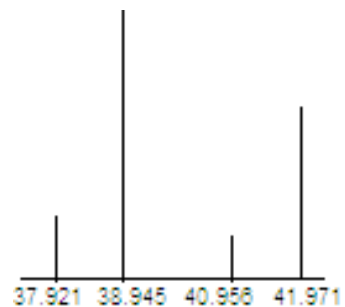
Ans: _____

7. When P_2O_5 reacts with HNO_3 , PH_3 is the only phosphorus containing compound produced. What mass of P_2O_5 would need to be reacted to produce 17.4 mg of PH_3 ?

Ans: _____

8. A compound is 42.08% Na, 18.89% P and the rest O. Its empirical formula is _____

9. An element has the mass spectrograph shown at right: Use a ruler to measure the peaks, then determine the relative percentages of the three isotopes. X-38_____ X-39_____ X-41_____ X-42_____ What is the average atomic mass: _____ What is the element? ____



10. In a certain compound, one sample was analyzed and found to contain 6.275 mg iron, 2.022 mg carbon and an unknown mass of oxygen. A second sample of the same compound was analyzed and found to contain 1.272 mg carbon, 5.088 mg oxygen and an unknown mass of iron. Determine the compound's empirical formula.

Ans: _____

11. A compound containing only carbon, hydrogen and oxygen is analyzed by combustion. A 1.832 g sample burns completely to produce 3.182 g of CO_2 and 1.736 g H_2O . Determine the compound's empirical formula.

Ans: _____

12. A compound containing only C, H, F and O is being analyzed. During one combustion experiment, a 1.800 g sample produced 1.662 g CO_2 and 0.566 g H_2O . In a second experiment a 2.245 g sample was reacted with sulfur and produced 0.764 g SF_6 . Determine the compound's empirical formula.

Ans: _____

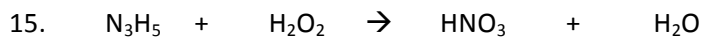
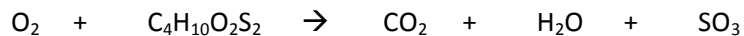
13. Three different compounds, C-1, C-2 and C-3, were all analyzed and found to contain the same element Q. The compound's molecular weights and percent Q are listed at right. Determine the most likely atomic weight (and identity) for element Q.

	m.w.	% Q
C-1	502	13.95%
C-2	108	25.93%
C-3	213	19.72%

Hint: How much would 1 mole of each compound weigh? How much Q would there be in a mole of each compound?

Ans: _____

Balance each of the following equations:



For problems 16-20, consider the reaction below:



16. What mass of aluminum would be needed to produce 0.024 moles of H_2 ?

Ans: _____

17. How many mg of HBr would be needed to react with 12.5 mg of Al?

Ans: _____

18. When 19.70 guaca of Al react with excess HBr, 145.7 guaca of AlBr_3 are produced. Calculate a) the theoretical yield and b) the percentage yield. (Note: "guaca" is the mass unit on the planet Tralfamador.)

a: _____

b: _____

19. What mass of AlBr_3 could be produced from the reaction of 43.2 g of Al and 3.98 moles HBr?

Ans: _____

20. If you were allowed only 100.0 g of total reactants, how much of each Al and HBr would you use to maximize your yield of product?

Al: _____ HBr: _____

For problems 21-24, you will need to write your own balanced equations:

21. What mass of air would be needed for the complete combustion of 13.4 kg of C_6H_{14} ? (Air is 21.2% oxygen by mass.)

Ans: _____

22. How many moles of N_2 would be needed to fully react with 4.3×10^{22} atoms of Ca?

Ans: _____

23. How many molecules of F_2 would react with a 12.4 cm x 6.8 cm x 2.3 cm block of aluminum? ($D_{Al} = 2.70$ g/mL)

Ans: _____

24. How many molecules of F_2 would react with a solution containing 0.565 moles of $AlBr_3$?

Ans: _____

25. Consider the reaction: $4 Ag + 2 H_2S + O_2 \rightarrow 2 Ag_2S + 2 H_2O$. a) What mass of silver sulfide could be produced from 6.500 g Ag, 0.9200 g H_2S and 0.5100 g O_2 ? b) What are the two excess reactants and how many moles of each are left over after the reaction?

a: _____

b: _____

27. A compound has an empirical formula: C_2H_3F , and 2.50×10^{23} molecules of this compound have a mass of 76.4 g. Determine the compound's molecular formula

Ans: _____

Ans: 0 2.44e-3 6.26e-3 0.024 0.237 0.43 1 1 1 2 2 2 2 2 3 3 3 3 3 3 3 3 4 4 4 4 5 5
5.490 6 6.691 7.8 8 8 8 9 10 10 10.0 11 11.7 12 14 17 22.66 31.3 36.3 39.8 39.93 48.2 49.2 57.3
74.87 82.25 90.0 112 194.6 224 354 686 7.84e20 1.550e21 1.307e23 5.10e23 1.8e25 6.536e23
units: g/mol N Ar g g g g g g g g g g g g g kg mg mg guaca % % % % % % % mol mol mol molecules
molecules atoms ions ions