

Name: KEY

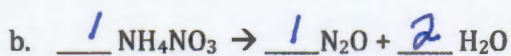
CHEM 1110.20787
Test 3, Form A
Spring 2013

Part 1 - Balancing equations and Stoichiometry Calculations (50 pts), show ALL work for credit.

1. (6 pts) Balance the following equations and identify the reaction type.

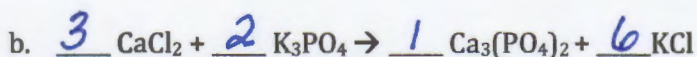
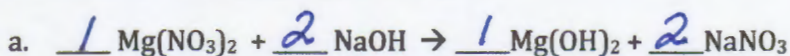


Reaction Type: combination



Reaction Type: decomposition

2. (4 pts) Balance the following equations.



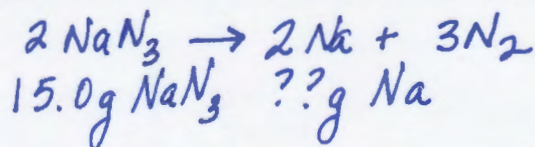
3. (10 pts) Write the balanced equation for the combustion of ethane, C_2H_6 .



4. (10 pts) Allicin is the compound responsible for the characteristic smell of garlic. The molecular formula of allicin is $\text{C}_6\text{H}_{10}\text{OS}_2$. What is the mass of carbon in 3.45 g of $\text{C}_6\text{H}_{10}\text{OS}_2$? (MM of $\text{C}_6\text{H}_{10}\text{OS}_2 = 162.27 \text{ g/mol}$)

$$3.45 \text{g } \text{C}_6\text{H}_{10}\text{OS}_2 \times \frac{1 \text{ mol } \text{C}_6\text{H}_{10}\text{OS}_2}{162.27 \text{g } \text{C}_6\text{H}_{10}\text{OS}_2} \times \frac{6 \text{ mol C}}{1 \text{ mol } \text{C}_6\text{H}_{10}\text{OS}_2} \times \frac{12.01 \text{g C}}{1 \text{ mol C}} = \underline{1.53 \text{g C}}$$

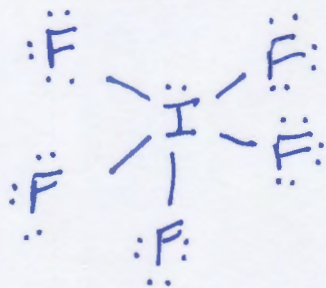
5. (10pts) Automotive air bags inflate when sodium azide, NaN_3 , rapidly decomposes to its component elements. What mass of sodium is formed when 15.0g of NaN_3 decompose? (MM of $\text{NaN}_3 = 65.01 \text{ g/mol}$)



$$15.0 \text{g } \text{NaN}_3 \times \frac{1 \text{ mol } \text{NaN}_3}{65.01 \text{g } \text{NaN}_3} \times \frac{2 \text{ mol Na}}{2 \text{ mol } \text{NaN}_3} \times \frac{22.99 \text{g Na}}{1 \text{ mol Na}} = \underline{5.30 \text{g Na}}$$

IF₅

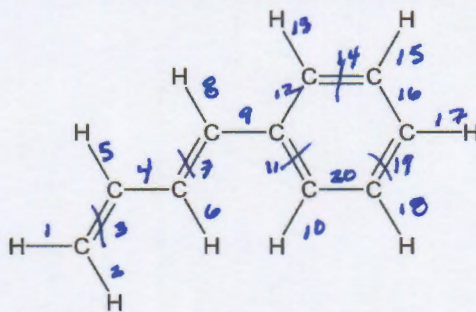
$$7 + 5(7) = 42$$



Molecular Geometry: square pyramidal
Hybridization: sp³d₂
Polarity: polar

Part 3 - Bonding and Electronegativity (10pts)

1. (5 pts) How many sigma and pi bonds are there in the following molecule?



20 sigma, 5 pi

2. (5 pts) Rank the following atoms in order of electronegativity: P, F, Cl, and Ge

Ge < P < Cl < F