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**Worksheet 8**

1. Calculate the energy, and then frequency of light given off as an electron moves from n = 5 to n=2.  
   (Ch. 9) **(E = -4.57E-19 J, 6.9E14 Hz)**
2. Find H for the reaction 2H2(g) + 2C(s) + O2(g) 🡪 C2H5OH(l), using the following thermochemical data (Ch. 8).   
   **(-485.62 kJ)**

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| C2H5OH (l) + 2 O2 (g) 🡪 2 CO2 (g) + 2 H2O (l) | H = -875. kJ |
| C (s) + O2 (g) 🡪 CO2 (g) | H = -394.51 kJ |
| H2 (g) + ½ O2 (g) 🡪 H2O (l) | H = -285.8 kJ |
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1. The structural formula for phosphine (PH3) might appear to be trigonal planar. Explain why the molecule is actually pyramidal in shape (Ch. 10).
2. Calculate the energy required to heat 100 grams of water from 30⁰C to 185⁰C (Ch. 12). **(272,458 J)**
3. How many electrons will fit in each the following orbitals: s, p, d, f (Ch. 9)?
4. Calculate the theoretical yield for the reaction between 47 grams of sodium and 67 grams of chlorine to produce sodium chloride (Stoichiometry). **(109 g)**
5. List four ways of expressing concentration and the formula for each (Ch. 13).
6. Determine the number of moles in a gas which occupies 2.6 L at 1.9 atm and 30⁰C (Ch. 11). **(0.199 mol)**
7. Calculate the molarity of a solution of magnesium chloride, if 29 grams is dissolved in 300 ml of water (Ch. 13).  
   **(1.02 M)**
8. For each of the following pairs of elements, which will have the greatest atomic radius (Ch. 9)?
   1. Silicon and Tin
   2. Technetium and Silver
9. For each of the following pairs, which will have the greatest reactivity (Ch. 9)?
   1. Magnesium and strontium
   2. Fluorine and chlorine
   3. Potassium and calcium
10. 120 grams of metal is heated to 95⁰C and then dropped into a flask containing 250 ml of water at 22⁰C. The final temperature of the water is 27⁰C. What is the specific heat of the metal (Ch. 12)? **(0.64 J/g 0C)**