**Review Problems for 2nd Semester Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Physical Science Honors**

1. Calculate the energy in eV of an electron in the n = 5 state for a hydrogen atom.
2. Calculate the energy in eV of an electron in the n = 2 state for a hydrogen atom.
3. Calculate the energy in eV of a photon that would be emitted as an electron falls from the n = 5 to the n = 2 state.
4. Calculate the energy in Joules of a photon that would be emitted as an electron falls from the n = 5 to the n = 2 state.
5. Determine the frequency of the photon from #4.
6. Write the electron configuration for iron.
7. Write the orbital box electron diagram for oxygen.

1. Calculate the average atomic mass of silicon given the following abundances.

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| --- | --- | --- |
| Isotope | Mass in u | Percent Abundance |
| 35Cl | 34.968852 | 75.78% |
| 37Cl | 36.965902 | 24.22% |

1. A radioactive sample decays to 5 grams after 4 half lives. What was the mass of the original sample?
2. How much of a 185 gram sample remains after 42 hours if the half-life is 8.4 hours?
3. A 100 gram sample of a radioactive element has a half-life of 50 hours. How long will it take for this sample to decay to 6.25 grams?
4. Answer the following questions from the solubility graph shown below.
   1. Which substance has the highest solubility at 90 °C? \_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. How many grams of solute C are needed to make a saturated solution of 200 grams of water at 80 °C?
   3. A saturated solution of B is made with 300 grams of water at 40 °C. The solution is cooled to 10 °C. How much of the solute crystallizes at the lower temperature?
   4. A saturated solution of A is made using 1250 grams of water at 50 °C. The solution is then heated to 100 °C. How many grams of A must be added to the solution to keep it saturated?
5. Write the names of the following compounds in the space provided.  
   1. Na3PO3 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. Mg(ClO2)2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   3. P2O5 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   4. Ag2CO3 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. Write the formulas for the following compounds.  
   1. Iron (II) sulfite \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. Lead (II) oxide \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   3. Trinitrogen heptoxide \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   4. Silver phosphite \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
7. Determine the shape of the following molecules.  
     
     
   1. CCl4 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ c. H2S \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. PH3 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ d. Cl2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
8. Draw the correct Lewis dot structure for:

|  |  |
| --- | --- |
| H2S | C2H4 |

1. Calculate the formula mass for Carbon Tetrachloride.
2. What is the percent by mass of sulfur in potassium sulfate?

1. A 2.5 gram sample of magnesium reacts with excess oxygen gas to form solid magnesium oxide.  
     
   1. Which reactant is the limiting reactant? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. What type of reaction is this? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   3. Write a balanced equation for this reaction, including all appropriate state symbols.

* 1. Calculate the amount of magnesium oxide produced by this reaction.

1. A 3.20 gram sample of zinc is placed into a beaker containing 7.50 gram of aluminum nitrate in an aqueous solution.
   1. Write a balanced equation for this reaction, including the state symbols.
   2. What is the formula mass of aluminum nitrate? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   3. What is the limiting reactant? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   4. How much of the excess reactant remains? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   5. Calculate the amount of each product that is produced.