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**Worksheet 6**

1. Show the number of half filled orbitals in each of the following elements:
   1. P
   2. Cs
   3. Hg
   4. Eu
2. Rank the following elements from most stable to least stable. Explain your ranking.

Ge, Ar, Zn, K

1. Scientists are studying a mystery gas. 30 gram so this gas will occupy a volume of 1500 ml at a pressure of 2 atm and standard temperature. Calculate the molar mass of this gas. **(224 g/mole)**
2. Draw the Lewis structure for the following molecules. Then indicate electron arrangement, shape and polarity: CH3Cl, N2, KrF4
3. For each of the following molecules, indicate whether it is ionic or covalent: NaCl, SCl6, SeO2, Al2O3.
4. For each pairing below, indicate which has the greater electron affinity. Explain each choice.
   1. Sr or Zr
   2. Co or Ir
   3. P or Cl
5. 450 ml of gas is collected over water at 980 torr and a temperature of 28⁰C. Determine the volume of the dry gas at STP. The vapor pressure of water at 28⁰ is 28.59 mmHg. **(511 ml)**
6. Determine the wavelength of a photon (in nm) which contains 2600 J of energy. **(7.6E-20 nm)**
7. Determine the wavelength of light given off when an electron passes from energy level 5 to energy level 3.   
   **(1.3E -6 m)**
8. What are the key differences between real gases and ideal gases?
9. A 100 gram sample of metal is heated to 300 degrees and then placed in a beaker of water containing 1800 ml of water. The temperature of the water changes by 15 degrees. What was the original temperature of the metal? The specific heat for this “mystery” metal would be 0.835 J/g⁰C.
10. Calculate the energy needed to heat 100 grams of ice from -5⁰C to 200⁰C. **(322,835J)**