

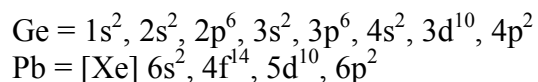
Chem 1061  
Fall 2004  
Quiz 3 (Take-home quiz)

The following problems are due Thursday, Dec 2 at the beginning of class.

1. Calculate the energy of the photon emitted when an electron in a hydrogen atom undergoes a transition from energy level  $n = 3$  to level  $n = 2$ . What frequency and wavelength light does this correspond to?

$$\begin{aligned} E_{\text{photon}} &= E_i - E_f \\ &= \frac{-R_h}{3^2} - \frac{-R_h}{2^2} \\ &= -R_h \left( \frac{1}{9} - \frac{1}{4} \right) = 3.026 \times 10^{-19} \text{ J} \\ \nu &= \frac{E}{h} = \frac{3.026 \times 10^{-19} \text{ J}}{6.63 \times 10^{-34} \text{ J} \cdot \text{s}} = 4.56 \times 10^{14} \text{ s}^{-1} \\ \lambda &= \frac{c}{\nu} = \frac{3.00 \times 10^8 \text{ m/s}}{4.56 \times 10^{14} \text{ s}^{-1}} = 6.57 \times 10^{-7} \text{ m} = 657 \text{ nm} \end{aligned}$$

2. Write the full electron configuration for Germanium ( $Z = 32$ ) and the abbreviated electron configuration for Lead ( $Z = 82$ ).



3. Write the abbreviated electron configurations for the following ions:  $\text{S}^-$ ,  $\text{S}^{2-}$ ,  $\text{Al}^{3+}$ ,  $\text{Sn}^{2+}$ , and  $\text{Fe}^{3+}$ .

