

Chem 20A Worksheet 3

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Problem 1

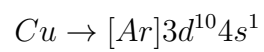
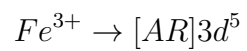
(a)

Cs, Na, Li, Ba, Mg

(b)

Rb, Ca, Si, N, F

Problem 2



Problem 3

We have that the corresponding energy levels would be

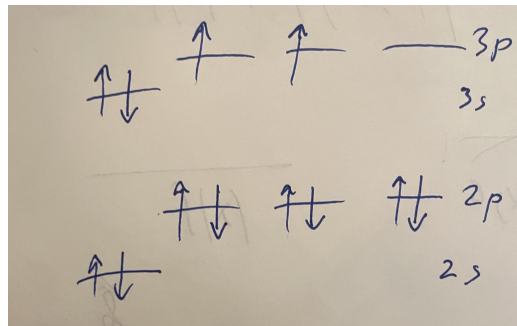
$$E_1 = \frac{ch}{\lambda} + \frac{1}{2}m_e V_1^2 = 4.011 \cdot 10^{-16} J$$

$$E_2 = \frac{ch}{\lambda} + \frac{1}{2}m_e V_2^2 = 4.003 \cdot 10^{-16} J$$

$$E_3 = \frac{ch}{\lambda} + \frac{1}{2}m_e V_3^2 = 3.856 \cdot 10^{-16} J$$

$$E_4 = \frac{ch}{\lambda} + \frac{1}{2}m_e V_4^2 = 3.682 \cdot 10^{-16} J$$

Which results in the following energy diagram



Problem 4

We have that

$$E_1 = -\frac{8^2}{1}(\text{rydberg}) = -8^2 \text{rydberg} = -1.395 \cdot 10^{-16} J$$

$$E_2 = -\frac{(8-3)^2}{2^2}(\text{rydberg}) = -\frac{5}{4} \text{rydberg} = -2.724 \cdot 10^{-18} J$$

$$E_3 = -\frac{(8-6)^2}{2^2}(\text{rydberg}) = -\text{rydberg} = -2.179 \cdot 10^{-18} J$$

Which results in the following energy level diagram

