

SHOW WORK TO RECEIVE CREDIT

$$E = h\nu \quad c = \lambda\nu \quad E_n = (-R_H)(1/n^2) \quad E = h\nu$$

$$R_H = 2.18 \times 10^{-18} \quad c = 3.0 \times 10^8 \text{ m/s} \quad h = 6.63 \times 10^{-34} \text{ J}\cdot\text{s}$$

1. Calculate the frequency of visible light having a wavelength of 486.1 nm.

$$c = \lambda\nu$$

$$\nu = \frac{c}{\lambda} = \frac{3.0 \times 10^8 \text{ m/s}}{486.1 \times 10^{-9} \text{ m}} = 6.17 \times 10^{14} \text{ s}^{-1}$$

2. What is the energy in joules of one photon of microwave radiation with a wavelength 0.122 m?

$$E = h\nu$$

$$\nu = \frac{c}{\lambda} \quad E = \frac{hc}{\lambda} = \frac{6.63 \times 10^{-34} \text{ J}\cdot\text{s} \times 3.0 \times 10^8 \text{ m/s}}{0.122 \text{ m}} = 1.6 \times 10^{-24} \text{ J}$$

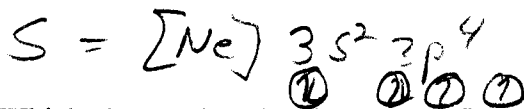
3. Calculate the energy, in joules, required to excite a hydrogen atom by causing an electronic transition from the $n=1$ to the $n=4$ principal energy level.

$$n=4 \quad E_n = \frac{-R_H}{n^2} = \frac{-2.18 \times 10^{-18} \text{ J}}{4^2} = -1.36 \times 10^{-19} \text{ J}$$

$$n=1 \quad E_n = \frac{-R_H}{n^2} = \frac{-2.18 \times 10^{-18} \text{ J}}{1^2} = -2.18 \times 10^{-18} \text{ J}$$

$$\Delta E = 2.04 \times 10^{-18} \text{ J}$$

4. How many unpaired electrons does an atom of sulfur have?

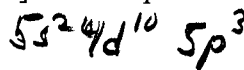


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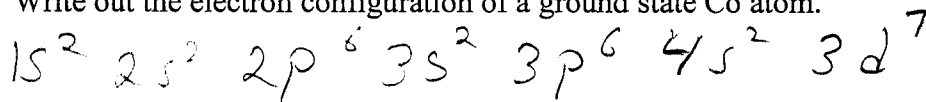
5. Which element has the electron configuration: $[\text{Kr}]5s^2 4d^{10} 5p^3$

Free



Sb

6. Write out the electron configuration of a ground state Co atom.



7. Arrange the following ions in order of increasing ionic radius, K^+ , P^{3-} , S^{2-} , Cl^- .

Increasing radius

All have e^- configuration of (Ar)

Look at # of protons (more protons = small)



8. Which of the elements listed below will have the greatest ionization energy?

a. Cs

b. Ga

c. K

d. Bi

e. As

Least metallic