

LAB: FLAME TEST

Name: \_\_\_\_\_ Date \_\_\_\_\_

Flame Test : Prelab Questions

1) Briefly describe the difference between the ground state and excited state.

2) How fast do all Electromagnetic Spectrum waves travel?

3) When we excite atoms, they give off certain wavelengths of light that we can see. Are these visible waves the only type of waves given off? Explain your answer.

**Directions:** Find the chemical compound for the specific question. Use the spray bottle and slowly squeeze the trigger and allow a burst of the aqueous solution to shoot into the flame. Record the color of the flame and then answer the questions below.

1) Lithium Nitrate - Color of Flame: \_\_\_\_\_

A) Rank the colors of the visible light spectrum from highest frequency to the lowest:

2) Lithium gives off waves that have  $3.06 \times 10^{-19}$  J of energy. Determine the wavelength of the waves.

2) Copper (II) Nitrate - Color of Flame: \_\_\_\_\_

A) Noble Gas Configuration for Copper:

B) Copper atoms produce waves that have an approximate frequency of  $5.714 \times 10^{14}$  Hertz. Determine the wavelength. Show work below.

3) Calcium Nitrate - Color of Flame: \_\_\_\_\_

A) List the different sublevels and indicate the number of orbitals for each.

B) The color seen by the Calcium atoms in this sample are from waves that have a frequency of  $6.00 \times 10^{14}$  Hertz.

Calculate how much energy is released by the waves.

4) Potassium Nitrate - Color of Flame: \_\_\_\_\_

A) Explain how potassium atoms become stable. Draw the isotopic notation of the most common potassium ion.

B) Potassium gives off a wave of approximately  $4.00 \times 10^{-7}$  m in length. Determine how much energy is given off by this wave.

5) Sodium Nitrate - Color of Flame: \_\_\_\_\_

A) List the maximum number of electrons that can fit in each of the first four energy levels.

B) The excited sodium atom produces wavelengths approximately  $5.90 \times 10^{-7}$  meters in length. Calculate the frequency of these waves. Show work below.

6) Strontium Chloride - Color of Flame: \_\_\_\_\_

A) Write the noble gas configuration for Strontium.

B) Waves from Strontium's emission give off  $2.85 \times 10^{-19}$  J of energy. Determine the wavelength of these waves.

7) Barium Nitrate - Color of Flame: \_\_\_\_\_

A) Describe the relationship between the frequency and wavelength of a wave. As one changes, how does the other variable respond?

B) Zinc atoms give off waves that are  $4.35 \times 10^{-7}$  meters. Determine the frequency of these waves.

8) Unknown: # \_\_\_\_\_ - Color of Flame: \_\_\_\_\_

A) Write the noble gas configuration for Lead:

B) Waves with a frequency of  $6.32 \times 10^{14}$  Hz are released by this element. Calculate the energy given off by these waves.