

Show your work

$$E = h\nu$$

$$\nu = c/\lambda$$

$$h = 6.626 \times 10^{-34} \text{ J}\cdot\text{sec}$$

$$c = 2.997 \times 10^8 \text{ m/sec}$$

$$29.9 \text{ ml} = \text{ounce}$$

$$0.62 \text{ mile} = \text{km}$$

$$i\hbar \frac{\delta}{\delta t} \psi = \mathfrak{H}\psi$$

$$\Delta x \Delta mv = h/2\pi$$

$$28.34 \text{ g} = \text{ounce}$$

$$\lambda = h/mv$$

$$1/\lambda = 1.097 \times 10^{-2} \text{ nm}^{-1} (1/m^2 - 1/n^2)$$

$$J = \text{kgm}^2/\text{sec}^2$$

1. True or False: The Auf bau principle describes filling orbitals from the highest energy to the lowest energy orbital.
2. What is Hund's rule?
3. What is the Heisenberg uncertainty principle? Give an example.
4. Why can the p energy level hold a maximum of 6 electrons and the d energy level can hold a maximum of 10 electrons?
5. The electron configuration for a lithium atom is:  $1s^2 2s^1$ . What is the electron configuration for the following:

calcium atom:

carbon atom:

argon atom:

iron atom:

neon atom:

sodium ion:

fluorine ion:

6. Which orbital is lower in energy once it is filled with electrons? Circle the lowest energy orbital

3d or 3p

2s or 1s

2s or 2p

4s or 3d

7. Write the principle quantum numbers for the last electron in a helium atom.
8. How many electrons are in the outermost shell for each of the following atoms:
  - a. carbon \_\_\_\_\_
  - b. helium \_\_\_\_\_
  - c. sulfur \_\_\_\_\_
  - d. sodium \_\_\_\_\_

9. What atom in the second row is the smallest? Why is it the smallest?

10. What is the effective nuclear charge for Fluorine?

11. What is the effective nuclear charge for Carbon?

12. What is the effective nuclear charge for sodium?

13. What is the effective nuclear charge for Chlorine?

14. Which is larger? Sodium ion or chloride ion? Why?