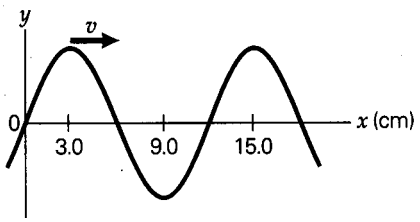
REVIEW QUESTIONS
Chapter 9

1. Determine the wavelength in the diagram shown below:



2. Arrange the following electromagnetic radiation in increasing order of wavelength:

X-rays Radiowaves Visible light Microwaves

_____ < _____ < _____ < _____
shortest longest

3. Arrange the following orbitals in increasing order of energy:

3p 4f 5s 3d 4p

_____ < _____ < _____ < _____ < _____
lowest highest

4. Identify each of the following elements from their electron configurations:

a) $1s^2\ 2s^2\ 2p^4$ _____

b) [Ar] $4s^2\ 3d^7$ _____

c) [Ne] $3s^2\ 3p^3$ _____

5. Shown below are excited states for some elements. Identify each element and write its ground state configuration:

   a) $1s^2\ 2s^2\ 2p^6\ 3s^1\ 3p^1$ _____ _____

   b) [Ar] $4s^2\ 3d^4\ 4p^1$ _____ _____

   c) $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^4\ 4s^1$ _____ _____

6. Using only a periodic table, write the notations requested for each element below:

   Sulfur (S):_____(complete configuration)

   Selenium (Se):_____(abbreviated configuration)

   Nickel (Ni): (orbital notation for valence electrons)

7. Give symbol and name the element in the fourth period of the periodic table with:

   a) 5 valence electrons _____

   b) a total of four 4p electrons _____

   c) a total of three 3d electrons _____

   d) a complete outer shell _____

8. Write complete electron configuration for each of the following ions:

a) F^{-} _____

b) P^{3-} _____

c) Al^{3+} _____

What do all the electron configurations above have in common?

9. Using electron configurations, explain why oxygen tends to form a 2– ion while calcium forms a 2+ ion.

10. According to the quantum mechanical model for the hydrogen atom, which transition produces light with longer wavelength: 3p to 2s or 4p to 2s? Give clear explanation and reasoning.

11. Complete each statement below with a suitable word or phrase:

A) Based on Bohr's model of atom, the electrons exist in _____ around the nucleus.

B) The arrangement of the electrons around the nucleus is called _____.

C) A particle of light is referred to as a(n) _____.

D) The group number of representative elements represents the _____.

E) The number of waves per unit of time is called _____.

F) Electrons that exist in the same orbital must possess _____.

G) When electrons descend from higher energy levels to lower ones they _____.