CHAPTER 5

Electrons in Atoms

Name: _____ **Date:** _____

In question 1, the speed of light, *c*, equals 3.00×10^8 m/s.

1 Yellow light has a wavelength of 5.60×10^{-7} meters. According to the formula, $c = \lambda\nu$, what is the frequency of this yellow light?

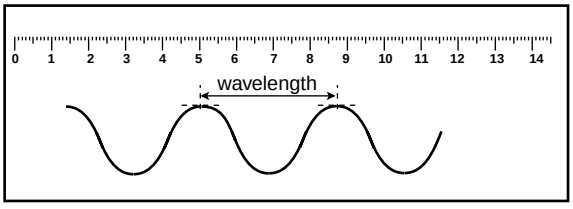
A $5.36 \times 10^{14}\ s^{-1}$

B $5.36 \times 10^{16}\ s^{-1}$

C $1.87 \times 10^{-15}\ s^{-1}$

D $1.87 \times 10^{15}\ s^{-1}$

Use the diagram below to answer question 2.



2 What is the wavelength of the wave shown above?

A 3.2 cm

B 3.5 cm

C 3.7 cm

D 4.0 cm

3 When a potassium compound is placed in a flame, energy is released and a violet color is produced. This energy release is due to —

A the release of gamma rays from the nucleus

B the return of excited electrons to lower energy levels

C the movement of electrons to higher energy levels

D the absorption of photons by the electrons

In question 4, Planck's constant, *h*, equals 6.626×10^{-34} J·s

4 According to Einstein, $E_{photon} = h\nu$. What is the energy of a photon if it has a frequency of $6.82 \times 10^{14} s^{-1}$?

A 9.72×10^{-20}J

B 1.03×10^{-20}J

C 4.52×10^{-19}J

D 4.52×10^{-20}J

GO ON

Name: _____ **Date:** _____

5 Which of these is the ground-state electron configuration for an atom of fluorine (atomic number = 9)?

A $1s^2 2s^2$

B $1s^2 2s^2 2p^3$

C $1s^2 2s^2 2p^4$

D $1s^2 2s^2 2p^5$

6 The electron configuration for an atom of iron is [Ar] $3d^6 4s^2$. Which of the following is the correct electron-dot structure for iron?

A Fe•

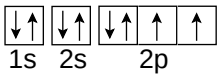
B Fe:

C :Fe:

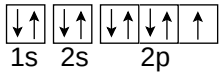
D :Fe:

7 Which of these orbital diagrams represents a chlorine atom in the ground state? Chlorine has an atomic number of 17.

A



B



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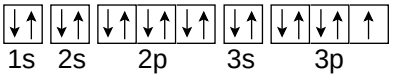
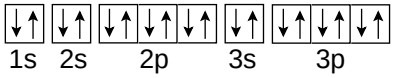


D



8 The arrangement of electrons in an atom of an element determines the chemical properties of that element. Our present-day understanding of how electrons are arranged in an atom is the result of all of these scientific contributions EXCEPT —

A Rutherford's gold foil experiment that proved the existence of the nucleus

B Bohr's orbits that explained hydrogen's quantized energy states

C De Broglie's equation that led to thinking of electrons as both particles and waves

D Schrödinger's wave equation that predicted atomic orbitals