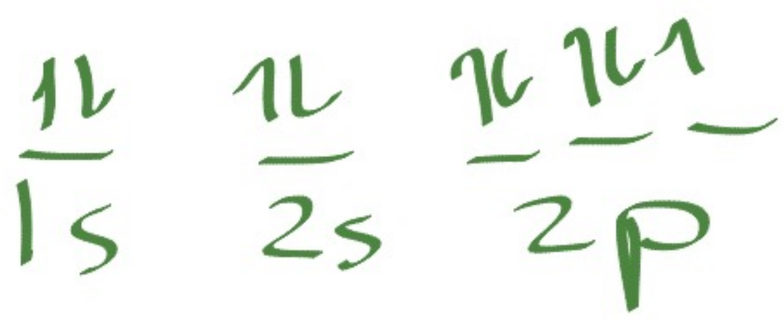
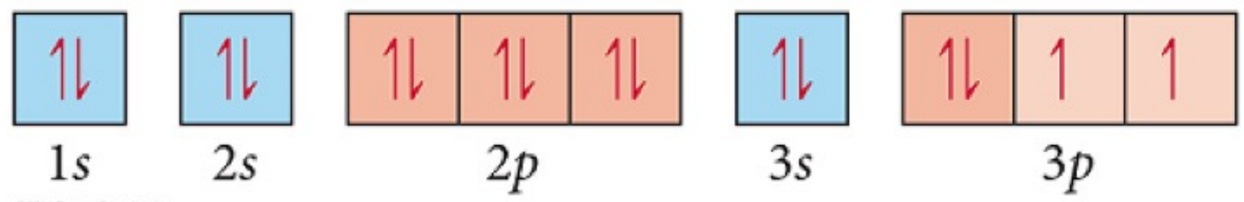
EZPZ Review: Unit 3 (Electrons)

This is called an "E-Z-P-Z" Review. This review only hits the basic and foundation of the unit.
The extended and more difficult questions were on your QUEST homework so look there! ☺
This is just to make sure you at least know the **basics**!

1) Complete the following table.

Lewis Dot	Orbital Notation	Set of Quantum Numbers to fill the **LAST** electron
		2, 1, 0, $-\frac{1}{2}$
	Standard Electron Configuration	**Noble Gas Configuration**
	$1s^2 2s^2 2p^5$	$[He]\,2s^2 2p^5$
Total # of electrons: 9	**# of valence e⁻:** 7	Quantum numbers for **ALL** the **valence** electrons: 2,0,0,$\frac{1}{2}$ / 2,0,0,$-\frac{1}{2}$ / 2,1,-1,$\frac{1}{2}$ / 2,1,0,$\frac{1}{2}$ / 2,1,1,$\frac{1}{2}$ / 2,1,-1,$-\frac{1}{2}$ / 2,1,0,$-\frac{1}{2}$

Lewis Dot	Orbital Notation	Set of Quantum Numbers to fill the **LAST** electron
		3, 1, −1, $-\frac{1}{2}$
	Standard Electron Configuration	**Noble Gas Configuration**
	$1s^2 2s^2 2p^6 3s^2 3p^4$	$[Ne]\,3s^2 3p^4$
Total # of electrons: 16	**# of valence e⁻:** 6	Quantum numbers for **ALL** the **valence** electrons: 3,0,0,$\frac{1}{2}$ / 3,0,0,$-\frac{1}{2}$ / 3,1,-1,$\frac{1}{2}$ / 3,1,0,$\frac{1}{2}$ / 3,1,1,$\frac{1}{2}$ / 3,1,-1,$-\frac{1}{2}$

NO Lewis Dot! Element Symbol:	Orbital Notation	Set of Quantum Numbers to fill the **LAST** electron
V	1s 2s 2p 3s 3p 4s 3d Valence e⁻	3, 2, 0, ½
	Standard Electron Configuration	Noble Gas Configuration
	$1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^3$	$[Ar]4s^2 3d^3$

Total # of electrons:	# of valence e⁻:	Quantum numbers for **ALL** the **valence** electrons:
23	2	4, 0, 0, ½ 4, 0, 0, -½

2) What do these letters stand for in terms of quantum numbers?

n = principal # → Energy lvl

l = Angular momentum # → orbital shape (s, p, d, f)

m_l = Magnetic # → position in orbital

m_s = spin → up spin or down spin

3) Identify the atoms through use of their arrangement of electrons:

a) $1s^2 2s^2 2p^6 3s^2 3p^1$ Al

b) $[Ar]4s^2 3d^{10} 4p^4$ Se

c) $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^9$ Cu

d) $[Xe]6s^1$ Cs

4) Which of the following elements shown below are in their excited state? (Circle all that apply.) Identify the element.

i. $1s^2 2s^2 2p^4 3s^1$ F

ii. $1s^2 2s^2 2p^4$ O

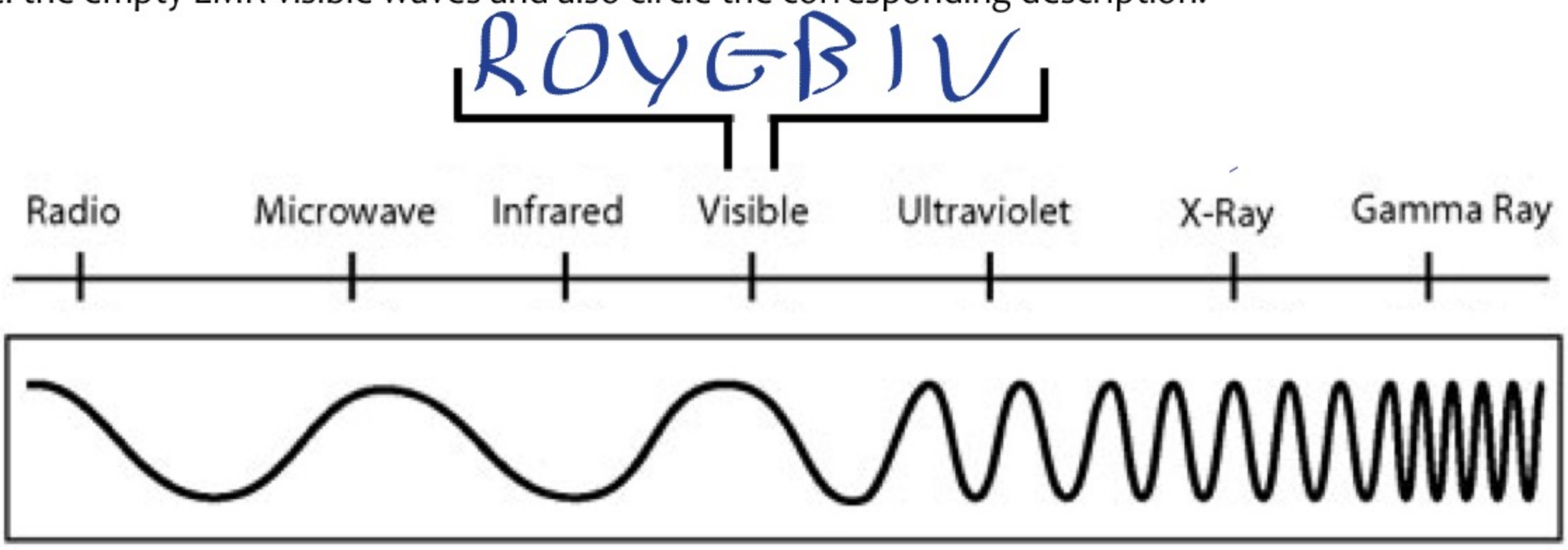
iii. $1s^2 2s^2 2p^6 3s^1$ Na

iv. $1s^2 2s^1 2p^6 3s^2 3p^2$ Al

5) How many **total** electrons are needed to fill:

a) the first energy level? 2 b) the second energy level? 8 c) the third energy level? 18

6) Label the empty EMR visible waves and also circle the corresponding description.



Circle the correct answer for each question below:

a. Which has higher energy? Radio or Microwave

b. Which has lower frequency? red or purple

c. Which has the longer wavelength? UV or Gamma

7) a) What equation shows how the wavelength and frequency of electromagnetic radiation are related?

$c = \lambda\nu$

b) What equation shows how the energy and frequency of electromagnetic radiation are related?

$E = h\nu$

c) What equation shows how the energy and wavelength of electromagnetic radiation are related?

$E = \frac{hc}{\lambda}$

8) Complete these EMR problems (use a separate sheet of paper):

a) A certain photon of light has a wavelength of 4.22×10^{-7} m. What is the frequency of this light?

7.11×10^{14} Hz

b) A photon has a wavelength of 0.960 m. What is the energy of this photon?

2.07×10^{-25} J

c) A certain red light has a frequency of 4.41×10^{14} Hz. What is the energy of this light? What is the energy of one mole of these photons in kJ/mole?

2.92×10^{-19} J

d) A photon of light has 4.93×10^{-19} J of energy. What is the wavelength of this photon?

4.03×10^{-7} m

e) A certain photon has a wavelength of 455 nm. What is the energy of one mole of these photons in kJ/mol?

$263 \frac{kJ}{mol}$

1 In a calcium atom in the ground state, the electrons that possess the *least* amount of energy are located in the

A first electron shell
B second electron shell
C third electron shell
D fourth electron shell

2 An atom of oxygen is in an excited state. When an electron in this atom moves from the third shell to the second shell, energy is

A emitted by the nucleus
B emitted by the electron
C absorbed by the nucleus
D absorbed by the electron

3 As an electron in an atom moves from the ground state to the excited state, the electron

A gains energy as it moves to a higher energy level
B gains energy as it moves to a lower energy level
C loses energy as it moves to a higher energy level
D loses energy as it moves to a lower energy level

4 A bright-line spectrum of an atom is caused when electrons

A release energy and jump to a higher energy level
B release energy and fall to a lower energy level
C absorb energy and jump to a higher energy level
D absorb energy and fall to a lower energy level

5 Which is an electron configuration of a fluorine atom in the excited state?

A $1s^2 2s^2 2p^4$
B $1s^2 2s^2 2p^5$
C $1s^2 2s^2 2p^4 3s^1$
D $1s^2 2s^2 2p^5 3s^1$

6 Which electron configuration represents a potassium atom in the excited state?

A $1s^2 2s^2 2p^6 3s^2 3p^3$
B $1s^2 2s^2 2p^6 3s^1 3p^4$
C $1s^2 2s^2 2p^6 3s^2 3p^6 4s^1$
D $1s^2 2s^2 2p^6 3s^2 3p^5 4s^2$

7 Which electron configuration represents an atom in an excited state?

A $1s^2 2s^2 2p^2$
B $1s^2 2s^2 2p^1$
C $1s^2 2s^2 2p^5 3s^2$
D $1s^2 2s^2 2p^6 3s^1$