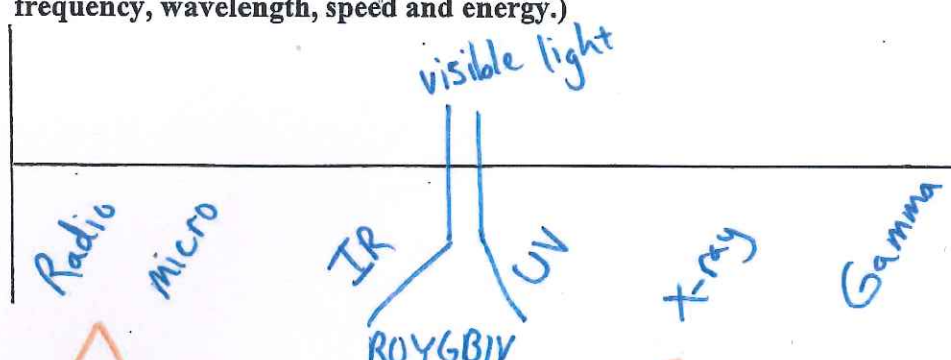


$$c = \lambda \cdot \nu \quad \left\{ \begin{array}{l} \nu = \frac{c}{\lambda} \\ E = h \cdot \nu \end{array} \right.$$

Name: **CALVIN**  
 Date:  
 Hour:

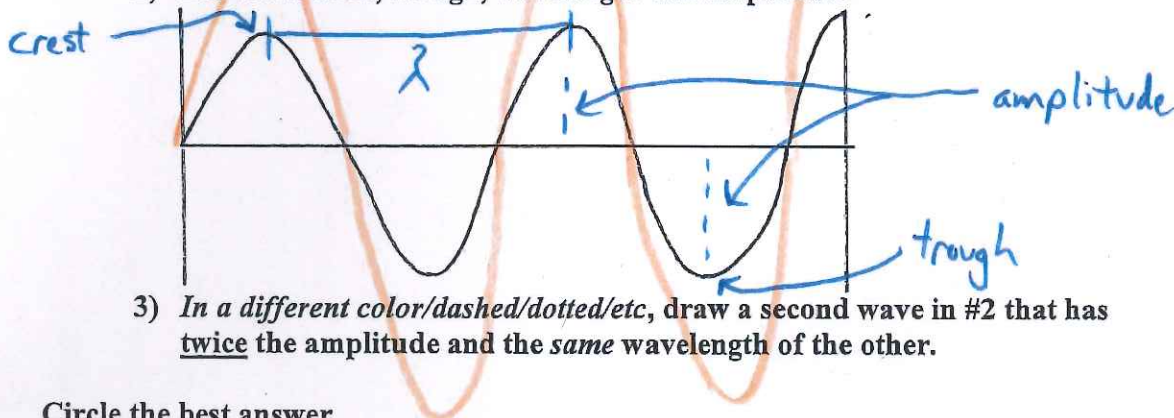
1) Fill in the electromagnetic spectrum below. (Indicate trends in frequency, wavelength, speed and energy.)

$\lambda = \text{large}$   
 $\nu = \text{small}$   
 $E = \text{small}$   
 speed = "c"



$\lambda = \text{small}$   
 $\nu = \text{large}$   
 $E = \text{large}$   
 Speed = "c"

2) Label the crest, trough, wavelength and amplitude.



3) In a different color/dashed/dotted/etc, draw a second wave in #2 that has twice the amplitude and the same wavelength of the other.

Circle the best answer

- 4) Frequency and wavelength are (directly, inversely) proportional.
- 5) Energy and frequency are (directly, inversely) proportional.
- 6) Red light has a (lower, higher) frequency than Blue light.
- 7) Microwaves have a (larger, smaller) wavelength than UV light.
- 8) Light will (speed up, slow down) when it travels from air to glass.
- 9) Radio waves are (faster, slower, the same speed) when compared to Infrared radiation.
- 10) COMPARE radio waves and gamma rays in terms of frequency, wavelength, energy and speed

	$\nu$	$\lambda$	E	speed
Radio		✓		"c"
Gamma	✓		✓	"c"

11) Give TWO specific examples that show that the speed of light is faster than the speed of sound.

Lightning/thunder, fireworks, hammering in distance, etc...

12) Identify the following elements:

- a. ...5f<sup>12</sup> Fm
- b. 48 electrons Cd
- c. ...4d<sup>7</sup> Rh
- d. ...6p<sup>3</sup> Bi
- e.  $\cdot\ddot{X}\cdot$  (give two possible choices for this one) N, P

13) Give the general (use "X" for symbol) Lewis dot diagram for elements found in:

a. Group 18



b. Group 2



c. Group 7



d. d - block



14) Tell which block from the periodic table each of the following belong to:

- i. Francium S
- ii. Tin P
- iii. Tungsten d
- iv. Californium F
- v. Helium S
- vi. Zinc d
- vii. S<sup>-2</sup> P
- viii. Na<sup>+1</sup> P

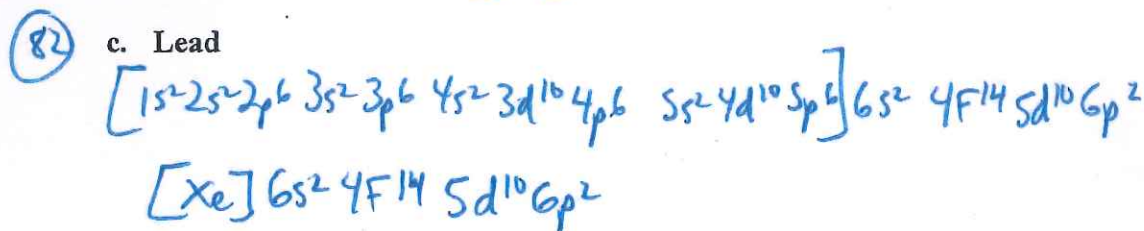
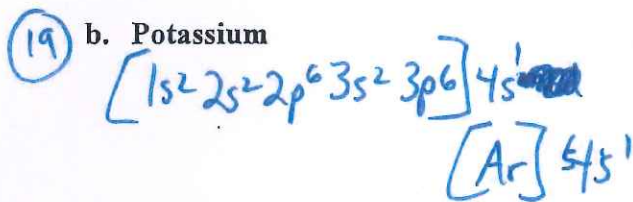
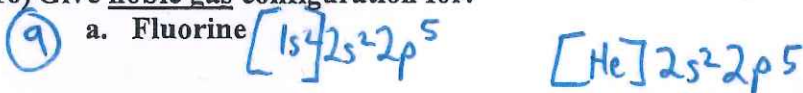
15) Element X has an electron configuration of  $1s^2 2s^2 2p^6 3s^2 3p^6 4s^1$

- Identify the element (Symbol) **K**
- Which group and which period does it belong to? **period 4, group 1**
- Is it a metal, nonmetal, or metalloid? **metal**
- Draw a Lewis dot diagram for this element **K.**
- List TWO other elements likely to have similar properties **Na, Li**
- Would this element be likely to gain or lose electrons?

Why?

**Lose, if one is lost it reaches an octet**

16) Give noble gas configuration for:



17) Find the frequency for a wave with a wavelength of  $4.55 \times 10^{-7}$  m.  
SHOW WORK, SIG DIGS, UNITS!

$v = ?$   
 $\lambda = 4.55 \times 10^{-7} \text{ m}$   
 $c = 3.00 \times 10^8 \text{ m/s}$   

$$v = \frac{c}{\lambda} = \frac{(3.00 \times 10^8 \text{ m/s})}{(4.55 \times 10^{-7} \text{ m})} = \boxed{6.59 \times 10^{14} \text{ Hz}}$$

18) Find the wavelength for wave that is  $4.2 \times 10^{14}$  Hz.

$\lambda = ?$   
 $v = 4.2 \times 10^{14} \text{ Hz}$   
 $c = 3.00 \times 10^8 \text{ m/s}$   

$$\lambda = \frac{c}{v} = \frac{(3.00 \times 10^8 \text{ m/s})}{(4.2 \times 10^{14} / \text{s})} = \boxed{7.14 \times 10^{-7} \text{ m}}$$



19) Write the frequencies for your two favorite radio stations:

Ex. Favorite #1: 97.1 Favorite #2: 107.1

Which station has a larger wavelength? 97.1 Higher NRG? 107.1

20) How many electrons possible:

- a. 1<sup>st</sup> principle energy level 2
- b. 2<sup>nd</sup> principle energy level 8
- c. 3<sup>rd</sup> principle energy level 18
- d. 4<sup>th</sup> principle energy level 32
- e. 6<sup>th</sup> principle energy level 32

21) Suppose the third energy level has 8 electrons, how many electrons to fill it completely?

10

22) Arrange EM waves from smallest *wavelength* to largest

gamma, x-ray, UV, visible light, IR, micro, radio

23) One sentence describing:

- a. Emission
- b. Absorption

24) Use a Lewis Dot structure to explain the Barium ion. Be sure to show that an octet is created... (Hint ~ start with e-config.)

1s<sup>2</sup> 2s<sup>2</sup> 2p<sup>6</sup> 3s<sup>2</sup> 3p<sup>6</sup> 4s<sup>2</sup> 3d<sup>10</sup> 4p<sup>6</sup> 5s<sup>2</sup> 4d<sup>10</sup> 5p<sup>6</sup> Ba : →

25) Use a Lewis Dot structure to explain the Fluoride ion. Be sure to show that an octet is created... (Hint ~ start with e-config.)

1s<sup>2</sup> 2s<sup>2</sup> 2p<sup>5</sup>



BONUS!!!!!!!!!! (30 pts)