Quantum Theory

© Original Artist
Reproduction rights obtainable from
www.CartoonStock.com

"You have reached the Heisenberg Institute. Your call
will be answered in random order."

Name_____

Test Date_____

Light: Is it a wave or particle?
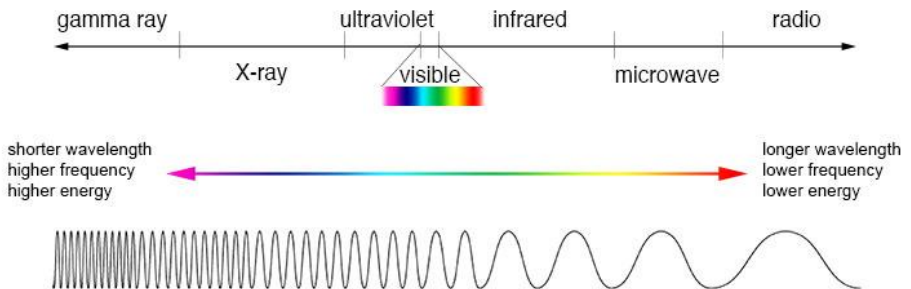
<u>Wave Properties:</u>
<u>Velocity</u>: (   )

<u>Frequency</u>: (   )

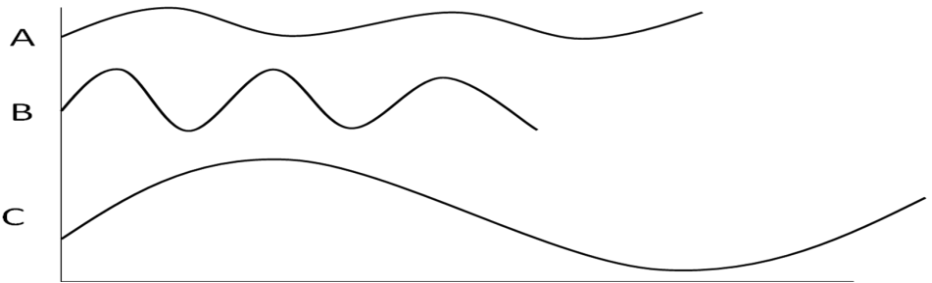<u>Wavelength</u>: (   )

<u>Amplitude</u>: (   )

All Electromagnetic Radiation travels at the _____ ____
_____ (c) = _____ in a vacuum

Waves with a long wavelength has a _____ frequency and
_____ energy

Waves with a short wavelength has a _____ frequency and
_____ energy

Answer the following using the EM spectrum in your reference table
1) Which type of wave has the greatest frequency?

2) In the visible spectrum, which color has the lowest energy?

3) Between x-rays and microwaves, which one has the highest frequency?

A

B

C

Analyze the pictures above in regards to energy, frequency and wavelength.

E vs. λ vs. ν

Direct relationship - _____

Inverse relationship - _____

Terms to know:

Term	Definition
Ground State	
Excited State	
Quantum	
Photon	

Light as a Particle

The Photoelectric Effect: _____
_____
_____

Bohr Model of the Atom
Useful only for the element _____
Assumptions:
1.

2.

3.

Bohr Model Formula: _____
n=
Na-   S-   Br-

Draw the Bohr Models
Na:

Ne:

*Electrons move from the _____ _____ to
_____ _____ when they absorb energy. They then
drop from the _____ _____ to the _____
_____ and release a _____.

Draw it:

Define It:	Atomic Emission Spectrum:

Absorption Spectrum:

Spectroscopy:

Try It: *using the Bohr Diagram*
1)

2)

3)

Orbital Diagrams and Electron Configuration:
Orbitals: 3-D region where electrons are located
Sublevels: energy level in which the orbitals are located
          Note – Sublevel Locations on the Periodic Table:

I A						VIII A
1 $1s$	II A			III A IV A V A VIA VII A		$1s$
2 $2s$						$2p$
3 $3s$						$3p$
4 $4s$		$3d$				$4p$
5 $5s$		$4d$				$5p$
6 $6s$		$5d$				$6p$
7 $7s$		$6d$				

$4f$
$5f$

Sublevels - # of Orbitals and Electrons

s Sublevel –

p Sublevel –

d Sublevel –

f Sublevel –

Each orbital can only hold a maximum of _____!

Rules for Determining Electron Configuration/Orbital Notation:
1)

2)

3)

Electron Configuration
Important Rules with the "d" and "f" block _____
_____
_____

Example: Cu

Example: Hg

Example: Bi

Example: Au

Noble Gas Electron Configuration
This is a short-hand version of electron configuration

Format: [X].......
           X = noble gas that comes directly before the element
                numerically
           …. = the rest of the electron configuration from that noble gas
                to the element

Example: Cu

Example: Hg

Example: Bi

Example: Au

Orbital Diagrams: Element: _____

Orbital Diagrams: Element: _____

Dot Diagrams
This represents the amount of valence electrons for the element

Valence electrons: _____
_____

These are represented as dots around the element with only 2 dots allowed per side of the element symbol.

The maximum amount of valence electrons = _____

Example: Cu

Example: Hg

Example: Bi

Example: Au