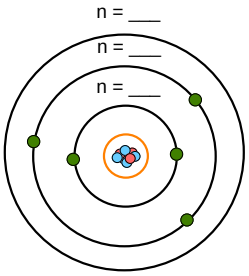
CONCEPT: BOHR MODEL

- In the **Bohr Model** of the atom, electrons travel around the nucleus in circular orbits called *shells*.
  - □ **Shell** (__): A grouping of electrons surrounding the nucleus that ties into their potential energy.
  - □ The Rydberg Constant = _____ when dealing with Joules.

Bohr Model

Bohr Model of the Atom



- □ ____ = energy level or shell #
- □ protons = ___ charged particle
- □ neutrons = neutral particle
- □ electrons = ___ charged particle
- □ nucleus = contains the ____ & ____

Potential Energy Formula

The energy of an electron within a specific shell can be determined by:

$$DE = -\left(\_\_\_\right)\left(\frac{\_\_\_}{\_\_\_}\right)$$

- □ E_n = Potential energy of electron
- □ ___ = Rydberg Constant = _____ J
- □ ___ = Atomic # of element

EXAMPLE: Calculate the energy of an electron found in the second shell of the hydrogen atom.

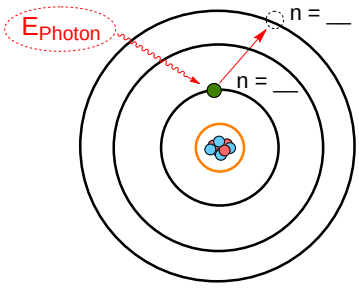
Absorption and Emission

- Through either the absorption or emission of energy, electrons are able to move between different shells.
  - □ **Absorption**: When an electron moves from a _____ numbered shell to a _____ numbered shell.
  - □ **Emission**: When an electron moves from a _____ numbered shell to a _____ numbered shell.

Absorption & Emission

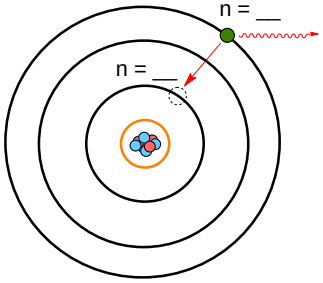
Absorption

The electron _____ energy and jumps to a higher energy ("excited") state.



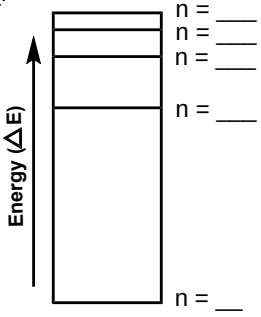
Emission

The electron _____ (releases) energy and falls down to a lower energy ("ground") state.



Energy Transitions

As the shell # ___ , the distance between them ___.



- □ As the distance traveled by an electron _____, the energy needed _____.

CONCEPT: BOHR MODEL

PRACTICE: Which of the electron transitions represents absorption with the greatest frequency?

a) n = 5 to n = 3 b) n = 1 to n = 3 c) n = 2 to n = 4 d) n = 6 to n = 7 e) n = 4 to n = 5

PRACTICE: Which of the following transitions (in a hydrogen atom) represent emission of the shortest wavelength?

a) n = 3 to n = 1 b) n = 2 to n= 4 c) n = 1 to n = 4 d) n = 5 to n = 3 e) n = 2 to n = 5

PRACTICE: If the energy of an electron within the boron atom was calculated as -6.0556×10^{-18} J, at what energy level would it reside?