<u>Aim</u>: How do we draw the Bohr model of any atom?

1) **Bohr Model** – p^+ and n^0 in the nucleus, e^- in orbits

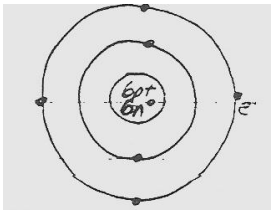
12.011

C

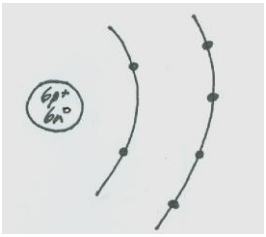
6

GROUND STATE

Electron Configuration **2-4**



or



The ***electron configuration***- tells us the # electrons in each orbit.

2) There are a maximum number of electrons that occupy each orbit. These are referred to as **"complete" (full)** energy levels.

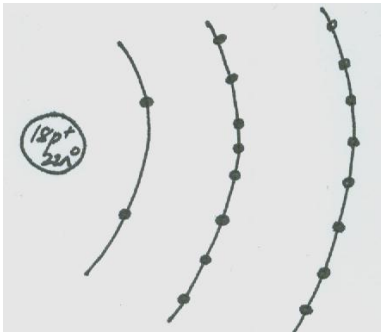
<u>Energy Level</u>	**<u>Max # of e^-</u>**
1st	2 e^-
2nd	8 e^-
3rd	18 e^-
4th	32 e^-

But, if it's the **last orbit**, the one furthest from the nucleus, the maximum number is **8 e^-**, these are called **valence** electrons; they are the most important b/c they are involved in chemical reactions.

Watch out for *** -18-32-10-2 for Hf;** this means that they didn't have room to write-in 2-8.

Let's try some more.

^{40}Ar



Since K has 19e^- you'd expect, 2-8-9, but actually it's **2-8-8-1** because the maximum #valence electron is 8.

3) Some basic questions. Refer to "give me a dozen" handout on the next page.

ALSO, we went over last nite's HW on BLS. That's on the last page.

RCHEM 1 / Chille

Hey, give me a dozen !

Answer the following questions based on Phosphorus

1) Symbol — P

2) period (row) number — 3

3) group (column) number — 15

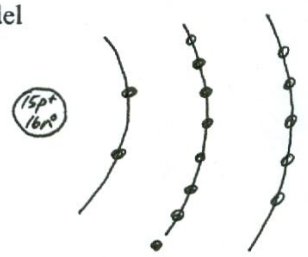
4) number of protons (p^+) — 15

5) number of electrons (e^-) — 15

6) number of neutrons (n^o) — 16

31 P 15

7) Bohr Model



8) number of occupied (containing at least 1 e^-) energy levels — 3

9) number of complete (according to 2-8-18-32) energy levels — 2

10) number of valence (in Last orbit) electrons — 5

11) Lewis (electron dot) diagram

We'll do this tom'

12) Possible electron configuration of excited state (as it appears in the periodic Table; e^- in lowest available energy levels)

GROUND — 2-8-5

a. 2-8-5 c.

b.

EXCITED - just move ONLY 1 e^- to 2n orbit further away from the nucleus

a. 1-9-5 c. 2-8-4-1

b. 2-7-6

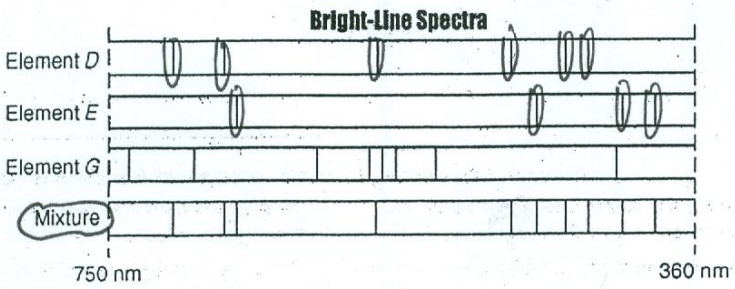
Name: _____

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

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 electron
   D) absorbed by the nucleus

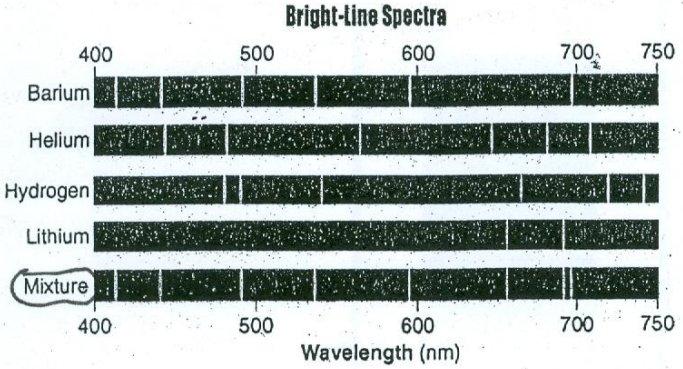
3) During a flame test, ions of a specific metal are heated in the flame of a gas burner. A characteristic color of light is emitted by these ions in the flame when the electrons
   A) emit energy as they return to lower energy levels
   B) gain energy as they move to higher energy levels
   C) gain energy as they return to lower energy levels
   D) emit energy as they move to higher energy levels

4) Given the bright-line spectra of three elements and the spectrum of a mixture formed from *at least* two of these elements:



Which of these elements are present in this mixture?
   A) *D* and *G*, only
   B) *E* and *G*, only
   C) *E* and *D*, only
   D) *D*, *E*, and *G*

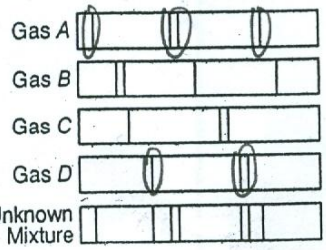
5) The diagram below represents the bright-line spectra of four elements and a bright-line spectrum produced by a mixture of two of these elements.



Which two elements are in this mixture?
   A) barium and lithium
   B) helium and hydrogen
   C) barium and hydrogen
   D) helium and lithium

Questions 6 and 7 refer to the following:

Many advertising signs depend on the production of light emissions from gas-filled glass tubes that are subjected to a high-voltage source. When light emissions are passed through a spectroscope, bright-line spectra are produced.



When e⁻ jump from the excited state to the ground state, LIGHT is emitted.

6) Identify the *two* gases in the unknown mixture in the given diagram.

Gases A & D

7) Explain the production of an emission spectrum in terms of the energy states of an electron.