PURPOSE How do we draw election configurations?

Warmup: Next to each, write how many electrons it has:

V 23e⁻ F 9 N 7 B 5

V^{5+} 18e⁻ F^- 10 N^{3-} 10 B^{3+} 2

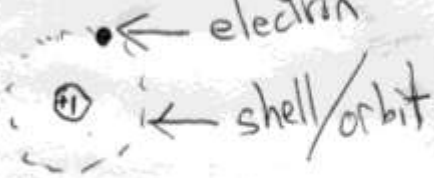
#2 How to draw electron Configuration.

	charge	mass (a.m.u.)
proton	+1	1
electron	-1	0
neutron	0	1

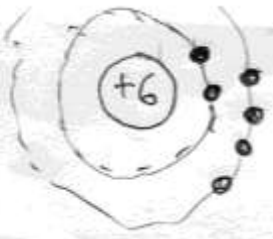
- the configuration has Shells
- each shell is an orbit where the e⁻ can go

EXAMPLES

Hydrogen



carbon



RULE

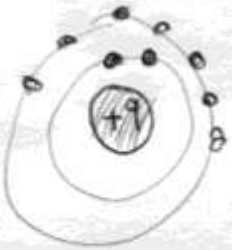
2 e^- is the most for shell 1

8 e^- is the most for shell 2

18 e^- is the most for shell 3

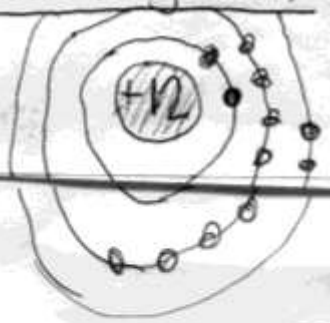
ELECTRONS GO AS CLOSE TO the nucleus AS possible

Draw fluorine



abbreviation 2-7

Draw Magnesium



abbreviation

2-8-2

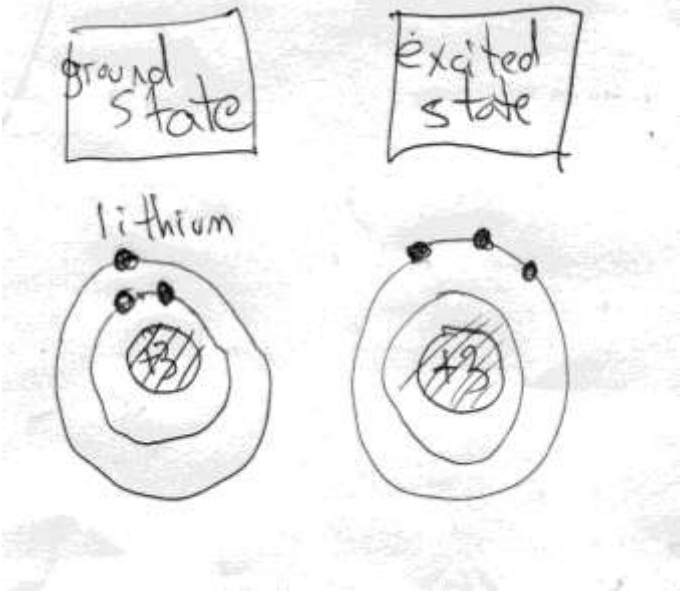
What element is this?

2-5 is nitrogen

Definitions

Ground State - the e^- are as close to the nucleus as 2-8-18 rule allows.

Excited state - some e^- are not at Ground State



What Spectra tell us about electron location.

EHS CλƷMIS+rγ - *Mr. Genest*

الكيمياء

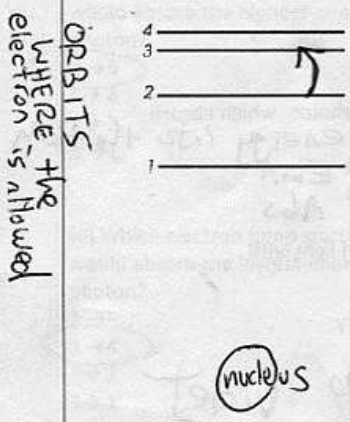
"Chemistry" by Noor

Name ANSWERS

Date

1. (Fill in the blanks by using the words low or high)

Each element produces a unique set of emission or absorption lines. An emission spectrum involves transitions of electrons from HIGH to LOW energy states. An absorption spectrum involves transitions of electrons from LOW to HIGH energy states. These transitions occur **only** between discrete energy levels, and thus the lines occur **only** at certain wavelengths and at no others.



2. Consider just four of the energy levels in a certain atom, as shown in this diagram:

a. draw arrows indicating all the possible transitions for an electron jumping **up** between any of the levels.[Hint: there are six possible]

b. How many different colors of light will be emitted when the electron moves **down** among these levels?
Six falls possible so six colors emitted

c. Which transition corresponds to the highest energy light emitted? START HIGH AND END LOW!
From n = 4 to n = 1 .

d. Which transition corresponds to the smallest energy light emitted?
From n = 4 to n = 3 .

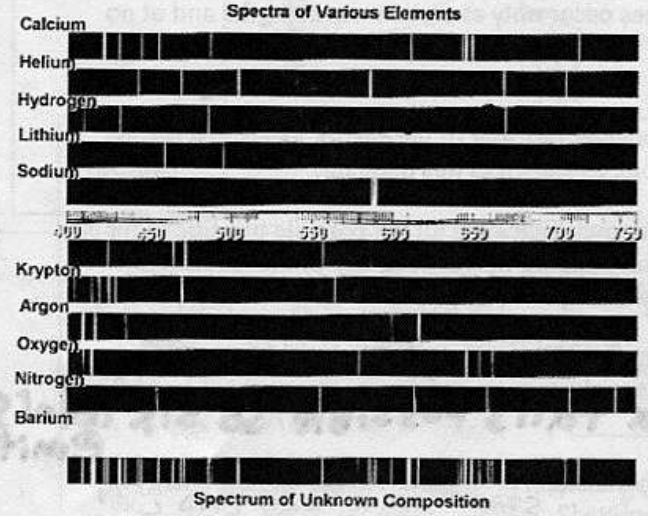
e. Which transition corresponds to the highest energy of heat absorbed?
From n = 1 to n = 4 .

f. Which transition corresponds to the smallest energy heat absorbed?
From n = 3 to n = 4 .

3. How can a hydrogen atom, which has only one electron, have so many spectral lines?

Because the single electron

4. What elements are present in the object that produced the "Spectrum of Unknown Composition"? Explain your method and relate this activity to the way astronomers use spectra to identify the composition of a star.



5. Which of the following electron transitions in a hydrogen atom will emit a photon, which absorb a photon? (How do you know?) rising levels always absorbs energy into the ATOM

A. n = 1 to n = 3 Abs
B. n = 4 to n = 3 Emit
C. n = 3 to n = 2 Emit
D. n = 3 to n = 1 Emit
E. n = 2 to n = 3 Abs

5B. Which of the above electron transitions in a hydrogen atom will result in emission of light with the most energy? "D" (3 to 1)

7. List the ***visible spectrum*** in order from lowest energy to highest energy, from memory:

red orange yellow green blue indigo violet

lowest energy **highest energy**

Remember:
An electron can move from a lower to a higher energy level by absorbing a photon.
An electron can move from a higher to a lower energy level by emitting a photon.

On these diagrams, only consider the five lowest permitted orbits/energy levels in a hydrogen atom, and that the amount of jump between levels is correlated to the energy of the photon that is absorbed or emitted.
An electron is currently in energy level 3, as shown at right.
Clearly circle your answers below.

(a) Which electron jump starting from energy level 3 would emit the highest-energy photon?

3→ 5
3 →4
3→ 2
3 →1

(b) Which electron jump starting from energy level 3 would emit the lowest-energy photon?

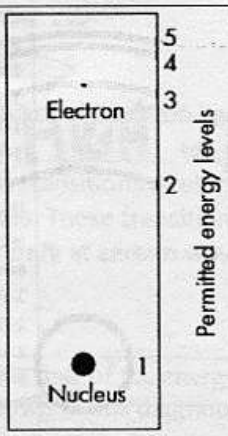
3 →5
3 →4
3→ 2
3 →1

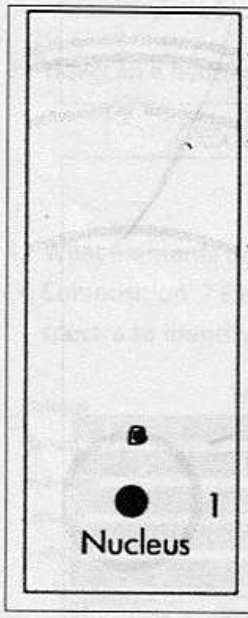
(c) Which electron jump starting from energy level 3 would absorb the highest-energy photon?

3 →5
3→ 4
3→ 2
3 →1

(d) Which electron jump starting from energy level 3 would absorb the lowest-energy photon?

3 →5
3 →4
3→ 2
3→ 1





Now consider an electron currently in the ground state (energy level 1), as shown at right. Clearly circle your answers below.

(e) Which electron jump starting from energy level 1 would absorb the highest-energy photon?

~~1→ 5~~
1→ 4
1→ 3
1→ 2

.

(f) Which electron jump starting from energy level 1 would absorb the lowest-energy photon?

1→ 5
1→ 4
1→3
1→ 2

~~6.~~ Explain why it is not possible for a ground state electron to emit a photon.

An electron at Level 1 has no further levels to fall down to

7. What is the difference between the ground state and the excited state of electron positions?

The electron at the ground state is closest to the nucleus and it has the least energy.

8. What does an atom do to emit a photon?

An atom's electron must fall closer to the nucleus to emit a photon

~~9. How can the energy levels of electrons be determined by measuring the light emitted from an atom?~~

~~10. Why does electromagnetic radiation in the ultraviolet region represent a larger energy transition than does radiation in the infrared region?~~

From memory, list the 3 types of radiation on the electromagnetic spectrum that are too high energy for the human eye to detect:

a. Gamma Ray
b. Ultraviolet
c. X-Ray

9. From memory, list the 3 types of radiation on the electromagnetic spectrum that are too low energy for the human eye to detect:

a. RADIO WAVE
b. INFRA RED
c. MICROWAVE