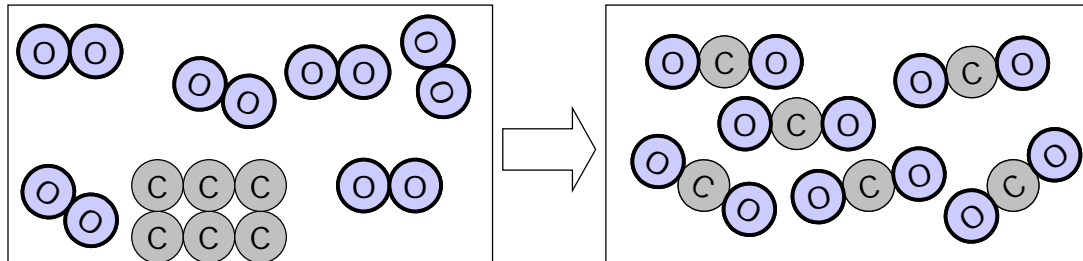
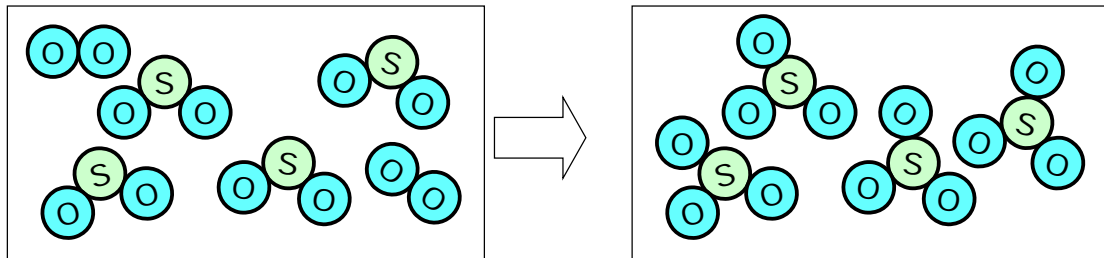


EXAM: "The Atomic Theory & The Periodic Table"

- 1 With the pictures below, do the following:
- classify the matter (0.5 POINTS)
 - classify the change (0.5 POINTS)
 - write the equations (0.5 POINTS)

1.5 POINTS
ESTIMATED TIME: 5 min



(this substance -carbon- has a fixed shape)

(You can use this space to write your answer)

Do the following:

- Write the missing information about atoms / ions and indicate which ones are isotopes (2 POINTS: 1 POINT for the NUMBERS, 0.5 POINTS for the ORBITAL DIAGRAMS and 0.5 POINTS for LEWIS)
- 2
- If average atomic mass (of the element in the table that has two isotopes) is 6.94, calculate their natural occurrence (0.5 POINTS)

NOTE:

- The symbols are not real
- You can get the mass of each atom from their mass number

ESTIMATED TIME: 10 min

Atom or ion	Z	A	# of			Electron Configuration	
			p ⁺	n ⁰	e ⁻	Orbital diagram	Lewis
${}^6_3\text{A}$						<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div> <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div> <div style="border: 1px solid black; width: 40px; height: 20px; display: inline-block;"></div> <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div> <div style="border: 1px solid black; width: 40px; height: 20px; display: inline-block;"></div> </div> 1s 2s 2p 3s 3p	
${}^{31}_{15}\text{B}$						<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div> <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div> <div style="border: 1px solid black; width: 40px; height: 20px; display: inline-block;"></div> <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div> <div style="border: 1px solid black; width: 40px; height: 20px; display: inline-block;"></div> </div> 1s 2s 2p 3s 3p	
${}^{\square}_9\text{C}^{-}$				10		<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div> <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div> <div style="border: 1px solid black; width: 40px; height: 20px; display: inline-block;"></div> <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div> <div style="border: 1px solid black; width: 40px; height: 20px; display: inline-block;"></div> </div> 1s 2s 2p 3s 3p	
${}^{23}_{11}\text{D}^{\square}$					10	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div> <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div> <div style="border: 1px solid black; width: 40px; height: 20px; display: inline-block;"></div> <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div> <div style="border: 1px solid black; width: 40px; height: 20px; display: inline-block;"></div> </div> 1s 2s 2p 3s 3p	
${}^7_3\text{E}$						<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div> <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div> <div style="border: 1px solid black; width: 40px; height: 20px; display: inline-block;"></div> <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div> <div style="border: 1px solid black; width: 40px; height: 20px; display: inline-block;"></div> </div> 1s 2s 2p 3s 3p	

(You can use this space to write your answer)

A hydrogen atom has its electron at ground state. That electron jumps to $n=4$ and later returns to their ground state performing two jumps. Look at the spectrum and determine:

3

- which are the two jumps from $n=4$ to the ground state (0.25 POINTS)
- the jumps in which the electron takes energy (0.25 POINTS)
- the jumps in which the electron releases energy (0.25 POINTS)
- draw all the jumps and the ionization energy in a energy diagram (0.25 POINTS)

1 POINT

ESTIMATED TIME: 10 min

UV

IR



(You can use this space to write your answer)

Identify (indicating the number) the elements that meet the properties that appear below

5

- a) the element from the second period that has $Z^* = 7$ (0.2 POINTS)
- b) the element from the third period that has $Z^* = 3$ (0.2 POINTS)
- c) the element from the first period that has $Z^* = 2$ (0.2 POINTS)
- d) the element with the smallest atom from the second period (0.2 POINTS)
- e) the element with the largest atom from halogens (0.2 POINTS)
- f) the element with the biggest metallic behavior from alkaline earth metals (0.25 POINTS)
- g) the element with the lowest value of electronegativity from the second period (the noble gases excluded) (0.25 POINTS)
- h) the element with the highest value of electronegativity from the group 16 (0.25 POINTS)
- i) the element from the group 13 which is a metal (0.25 POINTS)
- j) the element of the table with the highest metallic behavior, explaining the reasons (0.5 POINTS)

2.5 POINTS

ESTIMATED TIME: 10 min

1						2	
3	4						
11	12						
19	20						
		5	6	7	8	9	10
		13	14	15	16	17	18
						21	

(You can use this space to write your answer)