Atomic Structure and Electronic Arrangement Lab Report

Fausto Leonardo

Professor Ghatak

25 October 2022

Report Sheet - Lab 3

Date 10/23/22
Section _____
Instructor _____

Name Fauste Leonardo
Team _____
_____

Pre-Lab Study Questions

1. Describe the periodic table. – a tabular array of the Chemical elements organized by atomic number from the element with the lowest atomic number.

2. Where are the alkali metals and the halogens located on the periodic table?

group (1) ↳ GROUP 7A

3. On the following list of elements, circle the symbols of the transition elements and underline the symbols of the halogens:

Mg Cu (Br) Ag Ni (Cl) Fe (F)

mplete the list of names of elements and symbols:

Element	Symbol	Name of Element	Symbol
assium	K	~~Katium~~ Sodium	Na
Sulfur	S	Phosphorus	P
Nitrogen	N	Iron	Fe
Magnesium	Mg	Chlorine	Cl
Copper	Cu	Silver	Ag

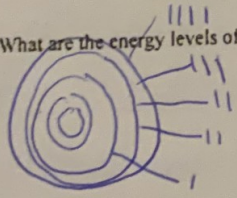
5. What is the color of a neon light?

Red/orange

6. Why does a sodium street lamp give off a different color light than a neon light?

The Sodium lamp Produces Yellow-orange light whit the neon Produces red color because the substances used in the lamp absorbs and emits different wavelengths of lights.

7. What are the energy levels of electrons?



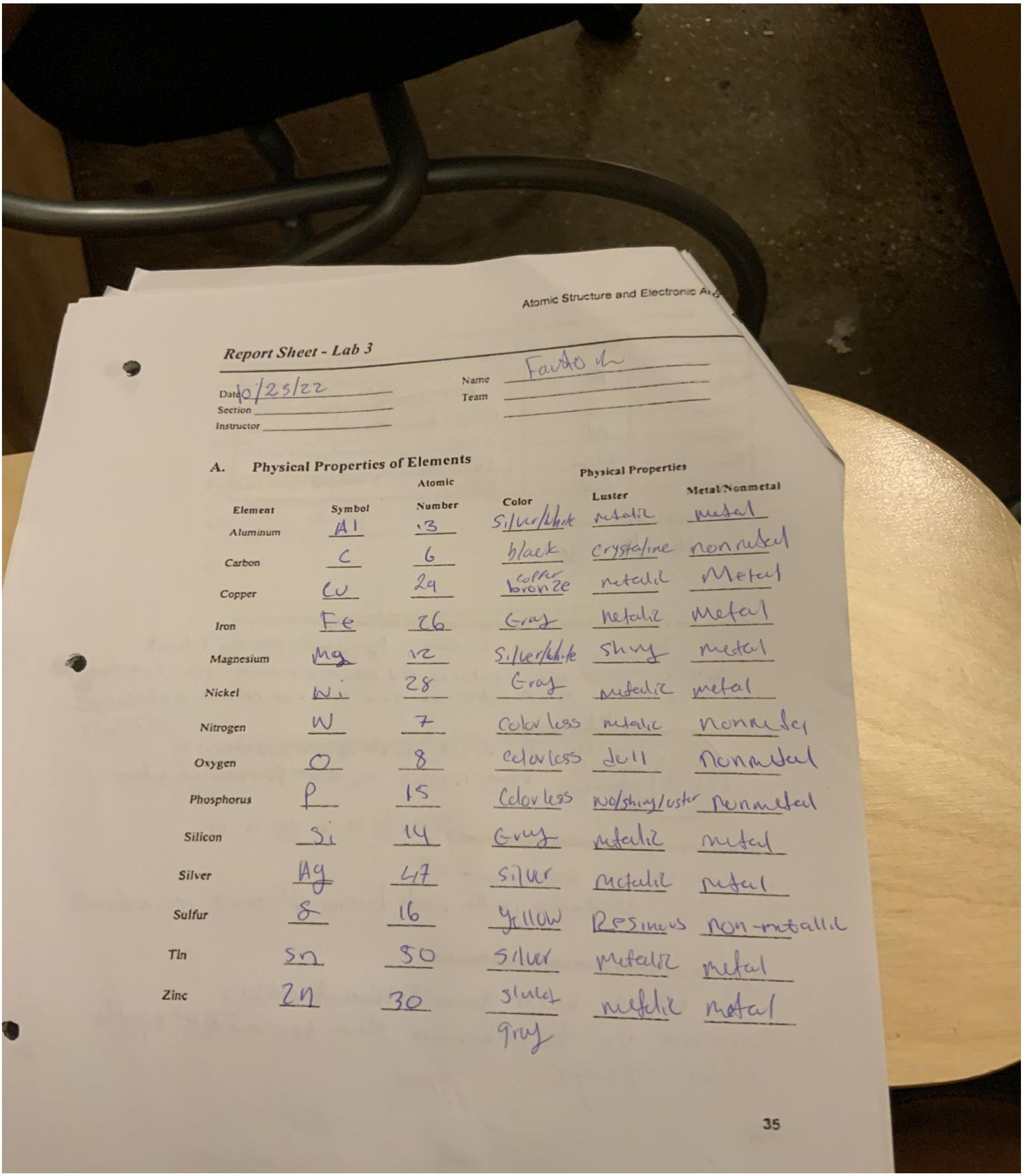
The fixed distance of electrons from nucles to that Particular atom.

8. Why do some elements produce colorful flames?

from the movement of the electrons in the metal ions Present in compounds

9. How can you identify an unknown using a flame test?

The flame will turn different colors based on the unknown then you can tell by the color change.



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A. Physical Properties of Elements

Element	Symbol	Atomic Number	Physical Properties: Color	Luster	Metal/Nonmetal
Aluminum	Al	13	Silver/white	metalic	metal
Carbon	C	6	black	crystaline	nonmetal
Copper	Cu	29	copper bronze	metalic	Metal
Iron	Fe	26	Gray	metalic	Metal
Magnesium	Mg	12	Silver/white	shiny	metal
Nickel	Ni	28	Gray	metalic	metal
Nitrogen	N	7	colorless	metalic	nonmetal
Oxygen	O	8	colorless	dull	Nonmetal
Phosphorus	P	15	Colorless	No/shiny/luster	Nonmetal
Silicon	Si	14	Gray	metalic	metal
Silver	Ag	47	silver	metalic	metal
Sulfur	S	16	yellow	Resinous	non-metallic
Tin	Sn	50	silver	metalic	metal
Zinc	Zn	30	silver gray	metalic	metal

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B. Periodic Table

B.1

1 H																	2 He
3 Li	4 Be												B	C	N	O	F	Ne
11 Na	12 mg												Al	Si	P	S	Cl	Ar
19 K	20 Ca	21 Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
37 Rb	38 Sr	39 Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe

Questions and Problems

Q.1 From their positions on the periodic table, categorize the following elements as metals (M) or nonmetals (NM).

Na M S NM Cu M F NM Fe M C NM

Ca M

Q.2 Give the name of each of the following elements:

a. Noble gas in Period 2 Ne b. Halogen in Period 2 fluorine (F)

c. Alkali metal in Period 3 Sodium d. Halogen in Period 3 ~~Chlorine~~ (Cl)

e. Alkali metal in Period 4 ~~Potassium~~ Calcium

B.2

Element	Metal/Nonmetal	Prediction: Shiny or Dull	Correct? Yes/No
Chromium	Metal	S	Yes
Gold	metal	D	Yes
Lead	mRtal	D	Yes
Cadmium	Metal	D	Yes
Silicon	N/A	S	Yes

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C. Subatomic Particles

Element	Atomic Number	Mass Number	Protons	Neutrons	Electrons
Iron	26	55.845	26	30	2, 8, 14, 2
Aluminum	13	27	13	14	13
Potassium	19	39.09883	19	20	19
Bromine	35	80	35	45	35
Gold	79	197	79	118	79
Iodine	53	126.90447	53	74	53

D. Isotopes

Nuclear Symbol	Protons	Neutrons	Electrons
$^{40}_{20}Ca$	20	20	20
Ca Calcium	20	22	20
$^{43}_{20}Ca$	20	23	20
Chromium	20	24	20
$^{46}_{20}Ca$	20	26	20

Questions and Problems

Q.3 A neutral atom has a mass number of 80 and has 45 neutrons. Write its complete symbol.

Bromine, $^{80}_{35}Br$

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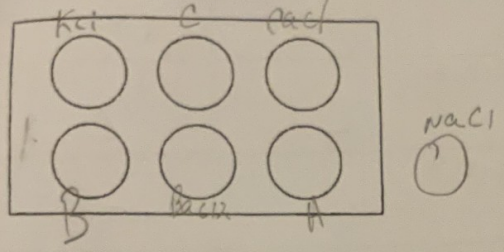
An atom has two more protons and two more electrons than the atom in question 3. What is its complete symbol? 82 37 Rb

D. Flame Tests

Spot plate diagram



Solution	Element	Color of Flame
$CaCl_2$	Ca	Orange/Red
KCl	K	blue/Light Purple
$BaCl_2$	Ba	Light green
$SrCl_2$	Sr	Red
$CuCl_2$	Cu	bluish-green
NaCl	Na	Orange

Solution C

Unknown Solution(s)

Identification letter	A	B	C
Color of flame	Yellow/Orange	Red	Blue/Green
Element present	Na	Sr	Cu

Questions and Problems

Q.5 You are cooking spaghetti in water you have salted with NaCl. You notice that when the water boils over, it causes the flame of the gas burner to turn bright orange. How would you explain the appearance of a color in the flame? The Presence of Sodium.

F. Drawing Models of Atoms

Atom	Model of Atom	Number of Valence Electrons	Group Number
$^{7}_{3}Li$	2,1	1	1
$^{14}_{7}N$	2,5	5	15
$^{25}_{12}Mg$	2,8,2	2	2
$^{27}_{13}Al$	2,8,3	3	13
$^{17}_{17}Cl$	2,8,7	7	17
$^{34}_{16}S$	2,8,6	6	16

Questions and Problems

Q.6 Write the electron arrangement for the following elements:

	Energy Level			
Element	1	2	3	4
P	2	8	5	
Na	2	8	1	
F	2	7		
C	2	4		
Ca	2	8	8	2

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