Instructions for Students:

1) Please complete the homework directly on this page if you can type or write neatly using your tablet or computer.

2) If you cannot directly annotate on your computer, please print out the homework, take pictures of each page with a phone and import the images on to separate pages. Please rotate and adjust the images so that your teacher can see your answers easily.

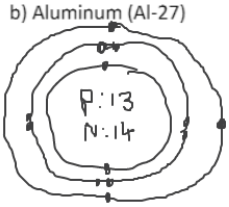
Olympiads: Grade 10 Science Homework Name: Adam Chen Mark: _____/72

G10 Science: Class 1 Homework

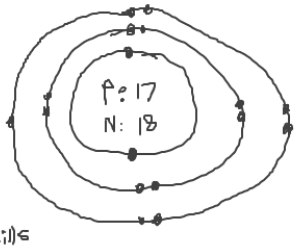
1. Draw the Bohr-Rutherford Diagrams for the following elements: **[3 marks]**

a) Nitrogen (N-14)

b) Aluminum (Al-27)



c) Chlorine (Cl-35)



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2. Draw the Lewis Diagrams for the following elements: **[3 marks]**

a) Bromine

b) Oxygen

c) Lithium Ion (Li^+)

3. Compare and contrast:

a) Ion and Isotope **[3 marks]**

They both have the same number of protons
Ions have different # of electrons
Isotopes have different # of neutrons

b) Physical and Chemical Property **[3 marks]**

Physical properties are properties like melting point, density and hardness. Chemical properties are defined by the material's ability to react with other materials.
Physical properties do not change the substance into a new substance.
Chemical properties change the substance.

c) Cation and Anion **[3 marks]**

Cations are atoms that have lost electrons (positive) while anion are atoms that have gained electons (negative)
Both Cations and Anions are charged particles

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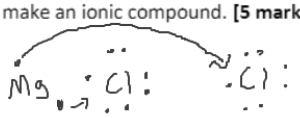
4. Complete the following table for the following ions: **[5 marks]**

Ion	Name	Number of Protons	Number of Neutrons	Number of Electrons
Mg^{2+}	Magnesium ion	12	12	10
S^{2-}	Sulfide ion	16	16	18
Fe^{3+}	Iron III ion	26	30	23
Br^{-}	Bromide ion	35	45	36
N^{3-}	Nitride ion	7	7	10

5. Draw the Lewis Dot Structure for magnesium and chlorine and show the transfer of electrons to make an ionic compound. **[5 marks]**



6. Decide if each pair will form an ionic compound. Write Yes or No in the space provided. **[5 marks]**

a) Mg and O — Yes
b) Zn and Cl — Yes
c) C and F — No
d) H and F — No
e) Sr and I — Yes

7. Dissolved ions are surrounded by water molecules which are polar molecules. This means that the water molecule has a partial positive charge on the Hydrogen atoms and a partial negative charge on the Oxygen atoms. Explain how the water prevents the ions from forming a solid again. **[2 marks]**

The water prevents the ions from forming a solid again because the polar water molecules are attracted to the dissolved ions, thus the ions don't cluster together

8. Name each of the following compounds: **[20 marks]**

Chemical Formula	Chemical Name
CaF_2	Calcium Flouride
K_2S	Potassium Sulfide
Al_2O_3	Aluminum Oxide
LiBr	Lithium Bromide
Ca_3P_2	Calcium Phosphide
$PbCl_2$	Lead II Chloride
Fe_2O_3	Iron III Oxide
SnS	Tin II Sulfide
Cu_3P_2	Copper II Phosphide
$CaCrO_4$	Calcium Chromate
CuF_2	Copper II Fluoride
K_3P	Potassium Phosphide
Cu_3P	Copper I Phosphide
$TiBr_3$	Titanium III Bromide
MnO	Manganese II Oxide
$KMnO_4$	Potassium Permanganate
CaS	Calcium Sulfide
CoN	Cobalt III Nitride
FeP	Iron III Phosphate
$BaCl_2$	Barium Chloride

9. Write the chemical formulas for the following compounds: **[20 marks]**

Chemical Formula	Chemical Name
CaCl2	Calcium chloride
AlPO4	Aluminum phosphate
MgS	Magnesium sulfide
Li3N	Lithium nitride
Ca3N2	Calcium nitride
FeBr2	Iron (II) bromide
MnO2	Manganese (IV) oxide
SnCl4	Tin (IV) chloride
Cu2S	Copper (I) sulfide
FeN	Iron (III) nitride
CuO	Copper (II) oxide
AgCH3COO	Silver acetate
Co2O3	Cobalt (III) oxide
Pb3N2	Lead (II) nitride
Al2S3	Aluminum sulfide
CaO	Calcium oxide
Be(OH)2	Beryllium hydroxide
Na3P	Sodium phosphide
CrF2	Chromium (II) fluoride
FeI3	Iron (III) iodide