

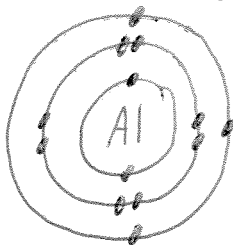
Answer Key

Section A - Drawing Bohr-Rutherford Diagrams of Atoms and Ions.

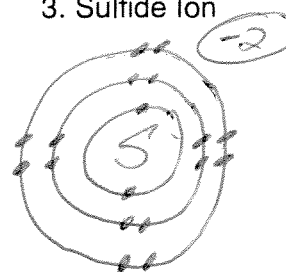
1. Lithium Ion



2. Aluminum Atom



3. Sulfide Ion



Section B - Understanding Atomic Structure. Complete the following table

Element Name	Atomic Number	Mass Number	Number of Protons	Number of Electrons	Number of Neutrons	Standard Atomic Notation
Sodium	11	23	11	11	12	²³ ₁₁ Na
Gallium	31	70	31	31	39	⁷⁰ ₃₁ Ga
Selenium	34	79	34	34	45	⁷⁹ ₃₄ Se
Tin	50	119	50	50	69	¹¹⁹ ₅₀ Sn
Carbon	6	12	6	6	6	¹² ₆ C
Manganese	25	55	25	25	30	⁵⁵ ₂₅ Mn

Element Name	Atomic Number	Mass Number	Number of Protons	Number of Electrons	Number of Neutrons	Standard Atomic Notation
Manganese (Isotope-56)	25	56	25	25	31	$^{56}_{25}\text{Mn}$
Manganese Ion (6+)	25	55	25	19	30	$^{55}_{25}\text{Mn}^{6+}$

Section C – Nomenclature

Give the compound name or formula as required for the following **univalent ionic compounds**.

1. Na_2O - sodium oxide
2. MgBr_2 - magnesium bromide
3. potassium chloride - KCl
4. magnesium fluoride - MgF_2

Give the compound name or formula as required for the following **divalent ionic compounds**.

1. PbCl_4 - lead (IV) chloride
2. SnCl_2 - Tin (II) chloride
3. iron(III) oxide - Fe_2O_3
4. copper(II) nitride - Cu_3N

Give the compound name or formula as required for the following **polyatomic ionic compounds**.

1. $\text{Mg}(\text{CO}_3)$ Magnesium carbonate
2. $\text{K}_3(\text{PO}_4)$ potassium phosphate
3. lithium sulphate Li_2SO_4
4. lead(II) bicarbonate $\text{Pb}(\text{HCO}_3)_2$

Give the compound name or formula as required for the following **molecular compounds**.

1. SO_2 sulfur dioxide
2. silicon tetrabromide SiBr_4
3. NBr_3 nitrogen tribromide
4. nitrogen phosphide NP

Give the compound name or formula as required for the following **binary acids**.

1. HBr hydrobromic acid
2. HF hydrofluoric acid
3. hydrophosphoric acid H_3P
4. hydrochloric acid HCl

Give the compound name or formula as required for the following **oxyacids**.

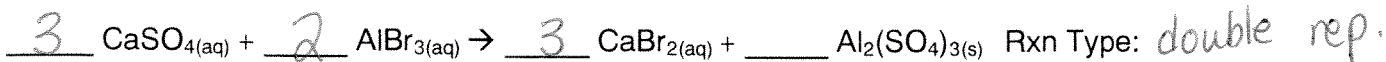
1. H_3PO_4 phosphoric acid
2. HNO_3 nitric acid
3. sulphuric acid H_2SO_4
4. carbonic acid H_2CO_3

Give the compound name or formula as required for the following **bases**.

1. $\text{Mg}(\text{OH})_2$ magnesium hydroxide
2. $\text{Fe}(\text{OH})_3$ iron(III) hydroxide
3. copper(II) hydroxide $\text{Cu}(\text{OH})_2$
4. aluminum hydroxide $\text{Al}(\text{OH})_3$

Section D

Balance the following equations and state the type of reaction.



Section E

Matching Questions

- | | |
|---------------------------------|---|
| 1. <u>E</u> Synthesis | A) $\text{A} + \text{BC} \rightarrow \text{B} + \text{AC}$ |
| 2. <u>B</u> Decomposition | B) $\text{AB} \rightarrow \text{A} + \text{B}$ |
| 3. <u>A</u> Single Displacement | C) $\text{Hydrocarbon} + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$ |
| 4. <u>D</u> Double Displacement | D) $\text{AB} + \text{CD} \rightarrow \text{CB} + \text{AD}$ |
| 5. <u>C</u> Combustion | E) $\text{A} + \text{B} \rightarrow \text{AB}$ |

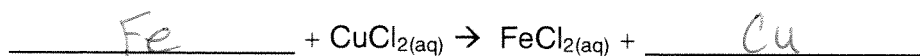
Section F

Completing and Balancing Chemical Equations.

1. Complete and balance the following double displacement chemical equation:



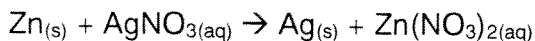
2. Complete and balance the following single displacement chemical equation.



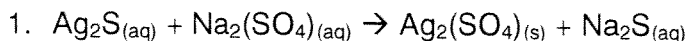
Section G

Word Equations. The formulas for the reactants and products are given, write the word equations and determine the type of equation.

Example



Zinc metal and aqueous silver nitrate react to produce silver metal and aqueous zinc nitrate (single displacement)



silver sulfide reacts with sodium sulfate to produce silver sulphate and sodium sulfide (double replacement)

Section H

More Word Equations. The word equations for each are given, write the balanced chemical equations and indicate the type of reaction.

Example

Potassium hydroxide and hydrogen phosphate react to produce water and potassium phosphate



1. solid potassium chlorate decomposes into oxygen gas and solid potassium chloride



2. Hydrochloric acid reacts with aqueous sodium hydroxide to produce aqueous sodium chloride and water.



3. Aqueous copper(II) chloride reacts with nickel metal to produce copper metal and nickel(III) chloride.



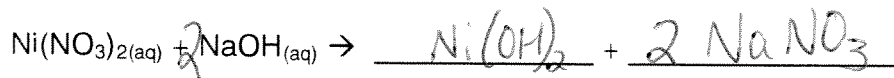
4. When $\text{HNO}_3(\text{aq})$ reacts with $\text{Mg}(\text{OH})_2(\text{aq})$, aqueous magnesium nitrate and water are produced. Write the proper word equation, chemical formulas, skeleton equation, and a balanced neutralization equation, including states, for this reaction.



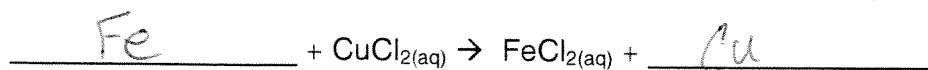
Section I

Completing and Balancing Chemical Equations.

1. Complete and balance the following double displacement chemical equation:



2. Complete and balance the following single displacement chemical equation.



Section J

Rates of Reactions.

There are four major factors (surface area, temperature, concentration, catalyst) which affect rates of reactions. Fill in the blank with the factor being described.

1. surface area The Alka-seltzer fizzes more quickly in water when it is crushed.
2. concentration Magnesium reacted more vigorously in the 2.0 M (16%) hydrochloric acid than in the 0.5 M (4%) hydrochloric acid.
3. catalyst At the Stelco steel plant in Hamilton, limestone is added to the iron ore and coke (coal) to produce steel at a lower temperature.
4. temp. Alka-Seltzer fizzed much more vigorously when placed in hot water compared to being placed in cold water.

Section K

Acids and Bases. MODIFIED True or False. Read the statements below. If the statement is true, write **True**. If the statement is false, write **False** and correct word(s) in **BOLD**.

1. T NaOH is a **base**.
2. F Fruit juices are ~~alkaline.~~
acidic
3. T Acids react to metals to produce **hydrogen** gas.
4. F A solution with a pH of 3 is ^{1000X} **twice** as acidic as a solution with a pH of 6.
5. F Neutralization occurs when you add **water** to a base.
6. T A solution with a pH of 4 is **100** times stronger than a solution with a pH of 6.
7. T Bases break down **fats and proteins** easily.
8. F A solution with a pH of 9 is a **stronger** base than a solution with a pH of 12.
9. T Bases have a **bitter** taste.
10. T Acids produce **H⁺** ions when they are dissolved.

