**Year 10 Chemical Science Exam Revision**

1. Two different types of atoms are isolated and their atomic and mass numbers are identified.

If the atoms can be represented as  and 

Determine (using a Periodic Table where necessary):

1. Number of **protons** in each type of atom

X: \_\_\_\_\_\_\_\_\_\_\_\_\_

D: \_\_\_\_\_\_\_\_\_\_\_\_\_

1. Number of **valence electrons** of each atom

X \_\_\_\_\_\_\_\_\_\_\_\_\_

D \_\_\_\_\_\_\_\_\_\_\_\_\_

1. the **ion** that each atom would be expected to produce if they reacted together.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. the **formula of the compound** made by reacting X and D together.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. **Sketch** the two isotopes of oxygen  and  showing the sub-atomic particles contained in each isotope.
2. **Copy and complete** the following table:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Particle | Number of Protons | Number of Neutrons | Number of Electrons | Atomic No. |
| 14  7  N |  |  |  |  |
| 23  11  Na+ |  |  |  |  |
| 35  17  Cl - |  |  |  |  |
|  | 14 | 15 | 10 |  |

1. Complete the following table

|  |  |  |
| --- | --- | --- |
| Atom/ion | Electron Configuration | Electron Configuration diagram |
| Lithium |  |  |
| Nitrogen |  |  |
| Argon |  |  |
| Magnesium ion |  |  |

1. Why can it be said that the fluoride ion is, in one way, similar to the noble gas neon?
2. Complete the table by putting in the **formulas**. The first one has been done for you.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **Negative Ions** | | | | | |
| **Positive Ions** | Chloride | Sulfide | Hydroxide | Nitrate | Sulfate | Phosphate |
| Potassium | ***KCl*** |  |  |  |  |  |
| Calcium |  |  |  |  |  |  |
| Tin (II) |  |  |  |  |  |  |
| Lead |  |  |  |  |  |  |
| Iron (III) |  |  |  |  |  |  |
| Ammonium |  |  |  |  |  |  |

1. Give the number of protons and neutrons in each of the following.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | protons, |  | neutrons |  |  | protons, |  | neutrons |
|  |  | protons, |  | neutrons |  |  | protons, |  | neutrons |
|  |  | protons, |  | neutrons |  |  | protons, |  | neutrons |
|  |  | protons, |  | neutrons |  |  | protons, |  | neutrons |

1. Give the **chemical names** for the following formulae.

**FORMULA NAME**

H2SO4 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

HNO3 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

CO2  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

N2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**FORMULA NAME**

H3PO4 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

CH3COOH \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

SO2  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Cl2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. State if each of the following statements are true or false. If they are false, rewrite the statement so that it is true.
2. Protons and neutrons have approximately the same mass. \_\_\_\_\_\_\_\_\_\_\_
3. In a neutral atom, the number of protons equals the number of neutrons. \_\_\_\_\_\_\_\_\_
4. The mass of an electron is one hundredth the mass of a proton. \_\_\_\_\_\_\_\_\_\_\_
5. The nucleus consists of protons and neutrons \_\_\_\_\_\_\_\_\_\_\_
6. The atom is mainly empty space \_\_\_\_\_\_\_\_\_\_\_
7. Most of the mass of an atom exists in the electron cloud \_\_\_\_\_\_\_\_\_\_\_
8. A compound contains two or more elements mixed together. \_\_\_\_\_\_\_\_\_\_\_
9. Classify the following as having ionic or metallic bonds
10. NaCl \_\_\_\_\_\_\_\_\_\_\_\_\_\_
11. Ag \_\_\_\_\_\_\_\_\_\_\_\_\_\_
12. Lead (II) Iodide \_\_\_\_\_\_\_\_\_\_\_\_\_\_
13. Magnesium Bromide \_\_\_\_\_\_\_\_\_\_\_\_\_\_
14. Brass \_\_\_\_\_\_\_\_\_\_\_\_\_\_
15. Describe in terms of electron transfer and ion formation the ionic bond that results when Na and S react together to form Na2S.
16. Write formula and name for each ionic compound formed between the listed pairs of ions.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Ion pairs | Formula | Name |
| 1 | K+ and I- |  |  |
| 2 | Ca2+ and F- |  |  |
| 3 | Al3+ and N3- |  |  |
| 4 | NH4+ and Cl- |  |  |
| 5 | Na+ and SO32- |  |  |
| 6 | Ba2+ and OH- |  |  |
| 7 | NH4+ and CO32- |  |  |
| 8 | Ti2+ and Br- |  |  |
| 9 | V3+ and S2- |  |  |
| 10 | Co3+ and NO3- |  |  |

1. Write ion pairs and formula for each ionic compound listed below and then use a solubility table to determine the solubility (soluble or insoluble) of the substance

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Name | Ion pair | Formula | Solubility |
| 1 | Lithium bromide |  |  |  |
| 2 | Potassium phosphide |  |  |  |
| 3 | Magnesium oxide |  |  |  |
| 4 | Ammonium sulphide |  |  |  |
| 5 | Aluminium nitrite |  |  |  |
| 7 | Calcium phosphate |  |  |  |
| 8 | Lead (II) acetate |  |  |  |
| 9 | Manganese (IV) nitride |  |  |  |
| 10 | Nickel (II) cyanide |  |  |  |

1. Complete a table showing the properties of metallic and ionic substances.

1. Complete the following sentences.

Metal atoms \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ electrons to form \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ions.

The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ on the periodic table tells us how many electrons are in the outer shell of an element.

The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ on the periodic table tells us how many shells contain electrons.

Non-metals become \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ reactive as the periods increase.

Metals become \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ reactive as the periods increase.

On the periodic table, Potassium is found in group \_\_\_\_\_\_\_\_ and period \_\_\_\_\_\_\_.

1. Describe 4 ways that the rate of a chemical reaction can be increased.
2. Balancing the following Chemical Equations

**A picture containing text, document, handwriting, font

Description automatically generated**

1. Write fully balanced chemical reactions for the following:
2. Hydrochloric acid reacted with aluminium
3. Sulfuric acid reacted with lithium hydroxide
4. Nitric acid reacted with calcium carbonate
5. Phosphoric acid reacted with potassium
6. Sulfuric acid reaction with iron (III) carbonate
7. Nitric acid reacted with zinc hydroxide

**Science Inquiry Exam Revision**

Hydrochloric acid reacts with sodium carbonate, producing sodium chloride, water and carbon dioxide gas. The balanced chemical equation for this reaction is:

2HCl + Na2CO3 → 2NaCl + H2O + CO2

A student conducted an experiment where 10.0 mL of 1.0 M acid was added to different masses of sodium carbonate. The student measured the volume of carbon dioxide gas produced in each case and recorded the results in a table:

|  |  |
| --- | --- |
| Mass of Na2CO3 (g) | Volume of CO2 produced (mL) |
| 0.05 | 11.5 |
| 0.10 | 23.0 |
| 0.20 | 46.0 |
| 0.25 | 57.5 |
| 0.30 | 61.2 |
| 0.35 | 61.2 |
| 0.40 | 61.2 |
| 0.45 | 61.2 |

1. Write a suitable hypothesis for this experiment
2. State the independent and dependent variable in this experiment:

Independent: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Dependent: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. State 2 variables which **must** be controlled in order for the experiment to be fair:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Construct a suitable graph of the data collected by the student on the graph paper provided below.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

1. What volume of carbon dioxide gas is produced when 0.15 g of sodium carbonate is added to the hydrochloric acid?
2. Write an inference as to why the volume of carbon dioxide produced did not increase after 0.3g of sodium carbonate was used.