**Key Facts for the start of Year 12**

1. Facts about sub-atomic particles.

|  |  |  |  |
| --- | --- | --- | --- |
| Particle | Abbreviation | Relative Charge | Relative Mass |
|  | P+ |  |  |
|  | n |  |  |
| electron |  |  |  |

1. Isotopes are …
2. Mass number (nucleon number) A

A= number of \_\_\_\_\_\_\_\_\_\_\_ + number of \_\_\_\_\_\_\_\_\_\_

1. Atomic Number, Z ,is also the number of….

Z = \_\_\_\_\_\_\_\_\_\_\_\_\_.

1. Number of neutrons =
2. The \_\_\_\_\_\_\_\_\_ of an element can be written in several different ways eg the \_\_\_\_\_\_\_\_\_ of Carbon with a mass of 13 can be written



or as 13C or as carbon-13

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ = Ar
2. Positive ions are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_.
3. Negative ions are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_.
4. Elements form ions with the following charges

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Group1 | Group2 | Group3 | Group5 | Group6 | Group7 |
|  |  | 3+ |  |  |  |

You also need to know that silver forms \_\_\_\_\_ and Zinc forms \_\_\_\_\_\_\_.

1. It is useful if you can learn the following polyatomic ions. Add the missing name or the formula as applicable.

|  |  |  |  |
| --- | --- | --- | --- |
| 1+ | 1- | 2- | 3- |
| ammonium\_\_\_\_\_ | \_\_\_\_\_\_\_\_\_\_\_\_\_OH- | Carbonate\_\_\_\_\_ | \_\_\_\_\_\_\_\_PO43- |
|  | Nitrate\_\_\_\_\_\_\_\_\_ | SulphateSO42- |  |
|  | Nitrile \_\_\_\_\_\_\_\_ | sulphite\_\_\_\_\_\_ |  |
|  | \_\_\_\_\_\_\_\_\_\_\_\_HCO3- | \_\_\_\_\_\_\_\_\_\_\_Cr2O72- |  |
|  | Manganate(Vii)(permanganate)\_\_\_\_\_\_ |  |  |

1. Writing equations

**Elements**

Are shown simply shown by their symbol except for a few elements that exist as small molecules. Most of these are d\_\_\_\_\_\_\_\_\_\_\_\_\_\_ molecules, containing two atoms H2, N2, O2, F2, Cl2, Br2 & I2. The only other elements that exist as small molecules are phosphorus P4 and sulphur S8. However it is normal practice to write sulphur simply as S in equations otherwise every formula in an equation has to be multiplied by 8.

Some elements such as carbon exist as macromolecules and these are just shown as the atomic unit eg C.

**Compounds**

Most covalent compounds exist as small molecules with a small number of atoms bonded together, for example CO2 and H2O. For equations the formula of the molecule is used.

For covalent compounds such as silicon dioxide which forms a macromolecule and ionic compounds the formula unit is used. Eg SiO2, NaCl.

1. State symbols

(g)= \_\_\_\_\_\_\_\_\_\_

(l)= \_\_\_\_\_\_\_\_\_\_

(s)= \_\_\_\_\_\_\_\_\_\_

(aq)= \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. The mass of one mole of an element is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
2. The mass of one mole of a compound is\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
3. Amount of Substance

 *n* = *m\_*

M

where

n = in mol.

m= in \_\_\_\_ .

M= in gmol-1

1. Molecular Formula =

eg Ethane=

1. Empirical Formula =

eg Ethane=

1. Moles & Solutions.

 if the volume is in dm3

 if the volume is in cm3

Where \_\_\_\_ = amount of substance in mol

 \_\_\_\_\_ =volume in dm3 or cm3

 \_\_\_\_\_\_\_ =concentration in moldm-3

1. Moles & Gas Volumes.

n= V\_ if the volume is in \_\_\_\_\_\_\_\_\_

 24

n= V\_ if the volume is in \_\_\_\_\_\_\_\_\_

 24000

Where n = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_in\_\_\_\_\_\_\_\_

 V =\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in \_\_\_\_\_\_\_\_\_\_\_\_\_

24/24000= the volume of one mol of gas in dm3/ cm3

1. The Ideal Gas Equation.

where

*p* = \_\_\_\_\_\_\_\_\_\_\_\_\_ in Pa

V = \_\_\_\_\_\_\_\_\_\_\_\_ in m3

N = \_\_\_\_\_\_\_\_\_\_\_\_\_ in mol

R = \_\_\_\_\_\_\_\_\_\_\_\_\_\_= 8.31 mol-1K-1

T = \_\_\_\_\_\_\_\_\_\_\_\_\_\_ in K

How to convert

cm3 to m3  :

dm3 to m3 :

oC to K :

kPa to Pa :

1. Percentage Yield Equation:
2. Atom Economy Equation:
3. Common Acids & Their Formulae. Fill in the missing names or formulae.

|  |  |
| --- | --- |
| Acid | Formula |
|  | HCl |
| Sulphuric acid |  |
|  | HNO3 |
| Ethanoic Acid |  |

1. General Equations for the reactions of acids. Complete them!

Acid + base 🡪 \_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_

Acid + alkali 🡪 \_\_\_\_\_\_\_ + \_\_\_\_\_\_\_\_\_

Acid + \_\_\_\_\_\_\_\_\_\_\_\_ 🡪 salt + water + carbon dioxide.

Acid + \_\_\_\_\_\_\_\_\_\_\_\_ 🡪 \_\_\_\_\_\_\_\_\_ + Hydrogen

1. Naming Salts.

|  |  |  |  |
| --- | --- | --- | --- |
| Acid | Reacts with | Name of salt | Formula of salt |
| Hydrochloric acid | Sodium |  |  |
| Sulphuric acid | Sodium oxide |  |  |
| Nitric Acid | Sodium carbonate |  |  |
| Ethanoic Acid | Sodium hydroxide |  |  |