Calculations in Chemistry Foundation Combined

Cm^3 and dm^3

$cm^3 \rightarrow dm^3 = \div 1000$

Sub-particles

Proton no, = atomic number

Electron no. = atomic number

Proton no. = mass number – atomic number

CONCENTRATION

A measure of the amount of moles in a given volume.

$$\text{Conc.}(\text{mol dm}^{-3}) = \frac{\text{moles (mol)}}{\text{Volume (dm}^3)}$$

$$\text{Conc.}(\text{g dm}^{-3}) = \frac{\text{mass (g)}}{\text{Volume (dm}^3)}$$

Relative Atomic Mass is the average mass of an atom of an element compared to the mass of 1/12th of an atom of carbon-12.

Relative atomic mass

$$\text{Relative atomic mass} = \frac{(\text{abundance of isotope 1 x mass of isotope 1}) + (\text{abundance of isotope 2 x mass of isotope 2})}{\text{Total abundance}}$$

Rate of reaction (g/s or cm^3/s)

$$\text{Mean rate of reaction} = \frac{\text{quantity of reactant used}}{\text{time taken}}$$

$$\text{Mean rate of reaction} = \frac{\text{quantity of product formed}}{\text{Time taken}}$$

Chromatography

$$Rf = \frac{\text{solvent front distance}}{\text{spot distance}}$$

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Chromatography

$$Rf = \frac{\text{solvent front distance}}{\text{spot distance}}$$

Calculations in Chemistry Higher Combined

Sub-particles
Proton no, = atomic number
Electron no. = atomic number
Proton no. = mass number – atomic number

MOLES
A measure of the amount of substance.

$$\text{Number of moles (n)} = \frac{\text{mass (m)}}{\text{Molar mass } (M_r)}$$

Mass is measured in grams.
Molar mass is calculated by adding the atomic masses (from the Periodic Table) together.

Relative Atomic Mass is the average mass of an atom of an element compared to the mass of 1/12th of an atom of carbon-12.

Relative atomic mass

$$\text{Relative atomic mass} = \frac{(\text{abundance of isotope 1} \times \text{mass of isotope 1}) + (\text{abundance of isotope 2} \times \text{mass of isotope 2})}{\text{Total abundance}}$$

REACTING MASSES

	H	C
mass		
A_r		
moles		
mass		

Number of moles = mass ÷ molar mass

Mass = moles (from above) x molar mass

From the question.

Molar mass from the atomic mass number on the Periodic Table.

Cm^3 and dm^3
$cm^3 \rightarrow dm^3 = \div 1000$

CONCENTRATION
A measure of the amount of moles in a given volume.

$$\text{Conc.}(\text{mol dm}^{-3}) = \frac{\text{moles (mol)}}{\text{Volume } (dm^3)}$$

$$\text{Conc.}(\text{g dm}^{-3}) = \frac{\text{mass (g)}}{\text{Volume } (dm^3)}$$

Rate of reaction (g/s or cm^3/s)

$$\text{Mean rate of reaction} = \frac{\text{quantity of reactant used}}{\text{time taken}}$$

$$\text{Mean rate of reaction} = \frac{\text{quantity of product formed}}{\text{Time taken}}$$

Chromatography

$$Rf = \frac{\text{solvent front distance}}{\text{spot distance}}$$

Energy change
Energy change = sum of energy needed to break bonds – sum of energy released making bonds

Calculations in Chemistry Foundation Triple

Sub-particles

Proton no, = atomic number

Electron no. = atomic number

Proton no. = mass number – atomic number

Relative Atomic Mass is the average mass of an atom of an element compared to the mass of 1/12th of an atom of carbon-12.

Cm^3 and dm^3

$cm^3 \rightarrow dm^3 = \div 1000$

CONCENTRATION

A measure of the amount of moles in a given volume.

$$\text{Conc.(mol dm}^{-3}\text{)} = \frac{\text{moles (mol)}}{\text{Volume (dm}^3\text{)}}$$

$$\text{Conc.(g dm}^{-3}\text{)} = \frac{\text{mass (g)}}{\text{Volume (dm}^3\text{)}}$$

Relative atomic mass

$$\text{Relative atomic mass} = \frac{(\text{abundance of isotope 1 x mass of isotope 1}) + (\text{abundance of isotope 2 x mass of isotope 2})}{\text{Total abundance}}$$

Rate of reaction

$$\text{Mean rate of reaction} = \frac{\text{quantity of reactant used}}{\text{time taken}}$$

$$\text{Mean rate of reaction} = \frac{\text{quantity of product formed}}{\text{Time taken}}$$

Chromatography

$$\text{Rf} = \frac{\text{solvent front distance}}{\text{spot distance}}$$

Percentage yield

$$\text{Percentage yield} = \frac{\text{Actual yield}}{\text{Theoretical yield}} \text{x100}$$

PERCENTAGE COMPOSITION

$$\text{\% composition} = \frac{\text{atomic mass element}}{\text{molar mass of compound}} \text{x 100}$$

Atom economy

$$\text{Atom economy} = \frac{\text{Mr of desired product}}{\text{Mr of all products}} \text{x100}$$

Calculations in Chemistry Higher Triple 1

Sub-particles

Proton no, = atomic number

Electron no. = atomic number

Proton no. = mass number – atomic number

Relative Atomic Mass is the average mass of an atom of an element compared to the mass of 1/12th of an atom of carbon-12.

MOLES

A measure of the amount of substance.

$$\text{Number of moles (n)} = \frac{\text{mass (m)}}{\text{Molar mass } (M_r)}$$

Mass is measured in grams.

Molar mass is calculated by adding the atomic masses (from the Periodic Table) together.

Relative atomic mass

$$\text{Relative atomic mass} = \frac{(\text{abundance of isotope 1 x mass of isotope 1}) + (\text{abundance of isotope 2 x mass of isotope 2})}{\text{Total abundance}}$$

Rate of reaction

$$\text{Mean rate of reaction} = \frac{\text{quantity of reactant used}}{\text{time taken}}$$

$$\text{Mean rate of reaction} = \frac{\text{quantity of product formed}}{\text{Time taken}}$$

Chromatography

$$Rf = \frac{\text{solvent front distance}}{\text{spot distance}}$$

GASES

$$\text{Moles of gas} = \frac{\text{volume of gas } (dm^3)}{24\ dm^3}$$

PERCENTAGE COMPOSITION

$$\% = \frac{\text{atomic mass element}}{\text{molar mass of compound}} \text{ x } 100$$

Energy change

Energy change = sum of energy needed to break bonds – sum of energy released making bonds

Atom economy

$$\text{Atom economy} = \frac{\text{Mr of desired product}}{\text{Mr of all products}} \text{x} 100$$

Percentage yield

$$\text{Percentage yield} = \frac{\text{Actual yield}}{\text{Theoretical yield}} \text{x} 100$$

Calculations in Chemistry Higher Triple 2

Cm^3 and dm^3
cm^3 → dm^3 = ÷1000

CONCENTRATION
A measure of the amount of moles in a given volume.

$$\text{Conc.(mol dm}^{-3}\text{)} = \frac{\text{moles (mol)}}{\text{Volume (dm}^3\text{)}}$$

$$\text{Conc.(g dm}^{-3}\text{)} = \frac{\text{mass (g)}}{\text{Volume (dm}^3\text{)}}$$

REACTING MASSES

Number of moles = mass ÷ molar mass

Mass = moles (from above) x molar mass

	H	C
mass		
A_r		
moles		
mass		

From the question.

Molar mass from the atomic mass number on the Periodic Table.

EMPIRICAL FORMULA

Number of moles = mass ÷ molar mass

Round to nearest whole number unless .5 – in this case double all answers

	H	C
mass		
A_r		
moles		
÷ by smallest		
Round		
formula		

From the question.

Molar mass from the atomic mass number on the Periodic Table.

Smallest number of moles from above

TITRATIONS
1. Balance the equation.
2. Work out the number of moles using n = c x V
3. Work out the molar ratio using equation.
4. Work out concentration using n from step 3 and c = n / V