Edexcel Chemistry A-level

Topic 5 - Formulae, Equations and Amounts of Substance

Flashcards

What is the symbol for amount of substance?

What is the symbol for amount of substance?

n

What is the unit used to measure amount of substance?

What is the unit used to measure amount of substance?

Mole

What does the Avogadro constant represent?

What does the Avogadro constant represent?

The number of atoms per mole of the carbon-12 isotope

How to calculate the mass of 1 mole of the element?

How to calculate the mass of 1 mole of the element?

Mass of 1 mole = relative atomic mass in grams

How to calculate moles when mass and molar mass are given?

How to calculate moles when mass and molar mass are given?

Moles (mol) = mass (g) / molar mass (g mol $^{-1}$)

What is an empirical formula?

What is an empirical formula?

Simplest whole number ratio of atoms of each element present in a compound

How to calculate empirical formula?

How to calculate empirical formula

- Divide the amount of each element by its molar mass

- Divide the answers by the smallest value obtained

- If there is a decimal, divide by a suitable number to make it into a whole number

State Avogadro's law

State Avogadro's law

Under the same temperature and pressure, one mole of any gas would occupy the same volume.

How much volume does a gas occupy, at room temperature and pressure?

How much volume does a gas occupy, at room temperature and pressure?

24 dm^3 or 24000 cm^3

Define molar gas volume

Define molar gas volume

The volume per mole of gas molecules

Why do different gas particles occupy the same volume?

Why do different gas particles occupy the same volume?

The gas particles are very spread out, hence individual differences has no effect.

How to calculate moles when gas volume is given?

How to calculate moles when gas volume is given?

Moles (mol) = volume (dm^3) / 24

Or

Moles (mol) = volume (cm^3) / 24000

What are the ideal ways in which gases behave? (5)

What are the ideal ways in which gases behave?

- They are in continuous motion
- No intermolecular forces experienced
- Exert pressure when they collide with each other or container
- No kinetic energy is lost in the collisions
- When temperature increases, kinetic energy of gases also increase

Write down the ideal gas equation (in words and symbols, including the units)

Write down the ideal gas equation (in words and symbols, including the units?

$pV = nRT$

Pressure (Pa) x volume (m^3) = number of moles (mol) x gas constant (8.314 J mol^{-1})x temperature (K)

1 atmospheric pressure is equal to how many pascal?

1 atmospheric pressure is equal to how many pascal?

1 atm = 101325 Pa

0℃ is equal to how many kelvin?

0℃ is equal to how many kelvin?

273 K

What does concentration of a solution mean?

What does concentration of a solution mean?

It is the amount of solute dissolved in 1 dm^3 of solvent

How do you calculate moles when concentration and volume are given?

How do you calculate moles when concentration and volume are given?

Moles (mol) = concentration (mol dm^{-3}) x volume (dm^3)

What is a standard solution?

What is a standard solution?

A solution of known concentration

Write down the steps to prepare a standard solution

Write down the steps to prepare a standard solution

1. Weigh the solute using the weigh by difference method
2. In a beaker dissolve the solute using the solvent
3. Pour the solution into a volumetric flask
4. Rinse the beaker using the solution and add it to the flask
5. Add solvent to the flask carefully until it reaches the graduation line
6. Mix the solution thoroughly to ensure complete mixing

What does the terms concentrated and dilute mean?

What does the terms concentrated and dilute mean?

Concentrated - large amount of solute per dm^3 of solvent

Dilute - small amount of solute per dm^3 of solvent

What is a species in a chemical reaction?

What is a species in a chemical reaction?

Any particle that takes part in a reaction

What are the four common state symbols?

What are the four common state symbols?

1. Solid (s)
2. Liquid (l)
3. Gaseous (g)
4. Aqueous (aq)

What does the percentage yield mean?

What does percentage yield mean?

The efficiency of which reactants are converted into products

What are the reasons for not obtaining 100% yield? (5)

What are the reasons for not obtaining 100% yield?

- Reaction may be at equilibrium
- The reactants may be impure
- Side reactions could happen
- Reactants or products may be left behind while transferring
- Loss of products during separation and purification

How is percentage yield calculated?

How is percentage yield calculated?

Percentage yield = (actual amount of product (mol) / theoretical amount of product (mol)) x 100

What does atom economy tell us about?

What does atom economy tell us about?

The proportion of desired products compared with all the products formed in the reaction

How is atom economy calculated?

How is atom economy calculated?

Atom economy = (molecular mass of desired product / sum of the molecular masses of all products) x 100

Does 100% yield mean 100% atom economy?

Does 100% yield mean 100% atom economy?

No, even if all the reactants are converted into products, not all products of the reaction will be the required products

Which type of reaction has 100% atom economy?

Which type of reaction has 100% atom economy?

Addition reactions (two or more reactants are combined to form a product)

What does systematic error mean?

What does systematic error mean?

The same error appears in each measurement

The error of mass measurement can be reduced by using which method?

The error of mass measurement can be reduced by using which method?

Weighing by difference method

Explain how to measure using the weighing by difference method

Explain how to measure using the weighing by difference method

1. Measure the mass of the container
2. Add the chemical to the container and weigh the container
3. Calculate the mass of the chemical
4. Transfer the chemical and remeasure the empty container
5. Calculate the mass of the chemical transferred

Is the percentage error higher or lower, when the quantity measured has been reduced?

Is the percentage error higher or lower, when the quantity measured has been reduced?

Higher