



Year:

10

Term:

Su1

Topic:

- 1 Which type of reaction releases energy into the surroundings?
- 2 Which type of reaction absorbs energy from the surroundings?
- 3 In an exothermic reaction, what has more energy in it? The products or the reactants?
- 4 In an endothermic reaction, what has more energy in it? The products or the reactants?
- 5 Define "activation energy"
- 6 Is energy released when bonds are broken or bonds are made? (HT only)
- 7 Is energy absorbed when bonds are broken or bonds are made? (HT only)
- 8 What would happen to the temperature of the surroundings in an exothermic reaction?
- 9 What would happen to the temperature of the surroundings in an endothermic reaction?
- 10 Give three examples of endothermic reactions
- 11 Give two examples of exothermic reactions
- 12 What is the other name for an energy level diagram?
- 13 What is the substance called that reduces the activation energy required by a reaction?
- 14 Do Exothermic or endothermic reactions require a bigger activation energy?
- 15 What is the unit for temperature?

Topic:

- 1 What are the components of a simple chemical cell?
- 2 What is the chemical difference between a rechargeable and non-rechargeable cell?
- 3 Which will provide a bigger potential difference in a chemical cell - when there is a big difference in reactivity between
- 4 Which metal becomes the negative electrode?
- 5 Which metal becomes the positive electrode?
- 6 What is the name of the fuel cell in which hydrogen is oxidised to produce water and energy?
- 7 Which type of reaction occurs in a rechargeable cell?
- 8 Which type of battery is more expensive initially? Rechargeable or non-rechargeable?
- 9 Which type of battery is more expensive in the long term?
- 10 What is the term which means using a chemical reaction with oxygen to produce a potential difference?
- 11 In a hydrogen fuel cell, where is water formed? The anode or cathode?
- 12 What is the half equation for the reaction of hydrogen and water at the cathode in a hydrogen fuel cell?
- 13 What is the half equation for the reaction of hydrogen at the anode in a hydrogen fuel cell?
- 14 Which ion does hydrogen form?
- 15 Which ion does oxygen form?

Topic:

- 1 What are the two equations for calculating mean rate of reaction?
- 2 If the mass of the product or reactant is given in grams, which unit should you use for the rate?
- 3 If the volume of the product or reactant is given in cm<sup>3</sup>, which unit should you use for the rate?
- 4 If the amount of the product or reactant is given in moles, which unit should you use for the rate? (HT only)
- 5 What does a steep gradient on a graph tell us about the rate of a reaction?
- 6 What does a flat line (0 gradient) on a graph tell us about the rate of a reaction?
- 7 What has a higher surface area? A powder or lumps of a substance
- 8 How does increasing concentration increase rate of reaction?
- 9 How does increasing temperature increase rate of reaction?
- 10 How does increasing pressure increase rate of reaction?
- 11 How does a catalyst increase rate of reaction?
- 12 What is activation energy?
- 13 State 4 factors that affect rate of reaction
- 14 How can you measure volume of gas produced?
- 15 How can you use turbidity (cloudiness) to measure rate of reaction?

Topic:

- 1 What is a reversible reaction?
- 2 Give two examples of reversible reactions
- 3 Is ammonium chloride  $\rightarrow$  ammonia + hydrogen chloride an endothermic or exothermic reaction?
- 4 What is it called when the forward and reverse reactions occur at exactly the same rate?
- 5 The effects of changing conditions on a system at equilibrium can be predicted using ...? (HT only)
- 6 Which 3 factors affect the position of equilibrium?
- 7 When the pressure of a system is increased, equilibrium will shift towards which side? (HT only)
- 8 When the pressure of a system is decreased, equilibrium will shift towards which side? (HT only)
- 9 When the temperature of a system is increased, the equilibrium will shift towards which side? (HT only)
- 10 When the temperature of a system is decreased, the equilibrium will shift towards which side? (HT only)
- 11 If the concentration of the reactants are increased, which reaction will be favoured? (HT only)
- 12 If the concentration of the reactants are decreased, which reaction will be favoured? (HT only)
- 13 What is a closed system?
- 14 What is the symbol for a reversible reaction?
- 15 What is the general equation for a reversible reaction?

Topic:

- 1 State the 'law of conservation of mass'
- 2 The sum of the Mr of the reactants must equal
- 3 State one example of when a reaction may APPEAR to lose mass
- 4 State the value of Avogadro's constant (HT only)
- 5 State the equation to calculate moles from mass and Mr (HT only)
- 6 State how to calculate Mr (relative formula mass)
- 7 State how to calculate atom economy (separate only)
- 8 State how to calculate percentage yield (separate only)
- 9 State how to calculate the mass of a reactant from a balanced symbol equation (separate only)
- 10 State how to calculate the mass of a product from a balanced symbol equation (separate only)
- 11 State how to calculate moles for gases (separate only)
- 12 State how to calculate concentration (separate only)
- 13 State how to convert cm<sup>3</sup> into dm<sup>3</sup> (separate only)
- 14 When a symbol equation is balanced, what is shown by the large numbers in front of a formula e.g. 2HCl?
- 15 What is the volume of 1 mole of any gas at room temperature and pressure?

## Endothermic and exothermic reactions (C.14)

Exothermic  
Endothermic  
Reactants  
Products  
Minimum amount of energy that particles must collide with to react  
Made  
Broken  
Increase  
Decrease  
Thermal decomposition reactions  
Self-heating cans  
Reaction profile  
Catalyst  
Endothermic  
  
Degrees Celsius

## Cells and batteries (separate only) (C.16)

Two metals, an electrolyte, some wires  
Renewable cells - chemical reaction reversed by an external electrical current  
Big difference  
Most reactive  
Least reactive  
Hydrogen fuel cell  
Reversible  
Rechargeable  
Non-rechargeable  
Electrochemical oxidation  
Cathode  
 $O_2 + 4H^+ + 4e^- \rightarrow 2H_2O$   
 $2H_2 \rightarrow 4H^+ + 4e^-$   
H<sup>+</sup>  
O<sub>2</sub><sup>-</sup>

## Rates of reaction (C.17)

mean ROR = quantity of reactant used/time take or quantity of product formed/time taken  
g/s  
cm<sup>3</sup>/s  
mol/s  
The rate of reaction is fast  
The reaction has stopped  
Powder because more particles are exposed and able to successfully collide  
More particles  $\rightarrow$  more frequent successful collisions  
Particles have more kinetic energy  $\rightarrow$  more collisions with activation energy  
Particles closer together  $\rightarrow$  more frequent successful collisions  
Provides an alternative pathway for the reaction with a lower activation energy  
The minimum amount of energy that particles must have to react  
Pressure (in gases), concentration, temperature, a catalyst  
Gas syringe  
Record time for a cross to disappear

## Reversible reactions and low grade copper ores (C.18)

A reaction that can go both forwards (to form the products) and backwards (to form the reactants)  
Ammonium chloride  $\rightleftharpoons$  ammonia + hydrogen chloride  
Endothermic  
Equilibrium  
Le Chatelier's Principle  
Pressure (gases), temperature, concentration  
Least molecules  
Most molecule  
Endothermic reaction  
Exothermic reaction  
The forwards reaction (to make more product)  
The backwards reaction (to make more reactants)  
A reaction (system) where no reactants are added or products removed.

## Chemical calculations, volumes and concentrations (C.19)

No atoms are lost or made during a chemical reaction  
The sum of the Mr of the products  
When a gas is produced and escapes  
 $6.02 \times 10^{23}$   
Moles (mol) = mass (g) / Mr  
The sum of the Ar (atomic masses) of each atom  
(Mr of desired product / sum of Mr of all reactants) x 100  
(actual yield / theoretical yield) x 100  
(mass of product / Mr of product) x Mr of reactant  
(mass of reactant / Mr of reactant) x Mr of product  
volume (dm<sup>3</sup>) = moles (mol) x 24dm<sup>3</sup>  
concentration (mol/dm<sup>3</sup>) = moles (mol) / volume (dm<sup>3</sup>)  
Divide by 1000  
The ratio of moles of each substance  
24dm<sup>3</sup>

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<p>1 What is the aim of the experiment?                  2 What is the independent variable?                  3 What is the dependent variable?                  4 Name 3 control variables                  5 What type of reaction is neutralisation?                  6 How do you improve the accuracy of the results?                  7 Why is a polystyrene cup used?                  8 What should you observe?                  9 Why is the test repeated and a mean found?                  10 Name 3 errors                  11 What results should you see?                  12 What should the results look like on a graph?                  13 Why does the temperature start to decrease at greater volumes?                  14 Name one risk and precaution                  15 What are possible variations in this method?</p>	<p><b>Topic:</b></p> <p align="right"><b>RP: Temperature changes (C4) (C.38)</b></p> <p>To investigate the temperature change during a neutralisation reaction                  The volume of NaOH solution                  The temperature change                  1) Volume of acid                  Exothermic                  1) Use a lid to reduce heat loss                  To reduce thermal energy dissipation                  An increase in temperature                  To improve the accuracy of the results                  1) Lid not completely covering cup                  As the volume increases, the temperature increases until it reaches a point and then will start to                  A line sloping upwards, followed by a line sloping downwards                  The thermal energy is spread out over a greater volume                  Dilute HCl and NaOH may harm eyes and skin - wear safety goggles and wash skin                  1) Water and calcium chloride (exothermic).</p>
<p>1 What is the aim of experiment 1?                  2 What is the independent variable of experiment 1?                  3 What is the dependent variable of experiment 1?                  4 Name 3 control variables of experiment 1                  5 How is the gas collected?                  6 Give two ways the volume of gas can be measured                  7 Give the most accurate way to measure the volume of gas produced                  8 What results should you see?                  9 Name one error                  10 What is the aim of experiment 2?                  11 What is the independent variable of experiment 2?                  12 What is the dependent variable of experiment 2?                  13 Name 3 control variables of experiment 2                  14 What results should you see?                  15 What are possible variations in this method?</p>	<p><b>Topic:</b></p> <p align="right"><b>RP: Rates of reaction (C5) (C.39)</b></p> <p>Investigate how concentration affects rate of reaction (using volume of gas produced)                  Concentration of hydrochloric acid                  Volume of gas produced in 30 seconds                  1) length of magnesium                  2) volume of acid                  A bung attached to a delivery tube is placed in the conical flask                  1) Gas syringe                  Using a gas syringe                  As the concentration increases, the volume of gas increases                  Gas escapes from the conical flask                  Investigate how concentration affects rate of reaction (using turbidity – aka cloudiness)                  Concentration of sodium thiosulphate                  Time taken for the cross to disappear                  1) concentration of acid                  As the concentration increases, the time taken for the cross to disappear decreases                  1) Effect of temperature</p>

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