GCSE CHEMISTRY EXAM

Q218

Which equation represents **neutralisation**?

A $4H^+ \longrightarrow 2H_2$

B $H_2O \longrightarrow 2H^+ + O^{2-}$

C $H^+ + OH^- \longrightarrow H_2O$

D $O_2 + H_2 \longrightarrow H_2O + O^{2-}$

Q418

Ethanol is a liquid at room temperature. It has a low melting point and boiling point.

Why?

A Ethanol is an ionic compound.

B The forces of attraction between ethanol molecules are strong.

C The forces of attraction between ethanol molecules are weak.

D There are no forces of attraction between ethanol molecules.

Q618

Which statement about **covalent** bonding is true?

A Electrons are transferred from one atom to another.

B Electrons are delocalised.

C Electrons are shared between atoms.

D Ions are formed.

Q818

A student separates a dye using thin layer chromatography.

She puts a thin layer of solid alumina onto a glass plate. She puts the dye on the pencil line. She puts the glass plate into a tank containing water.

Which of the following is the **stationary** phase?

A Alumina

B Glass

C Pencil line

D Water

Q1018

Which is the **best** explanation of a **concentrated** acid?

A The acid is completely ionised in solution in water.

B The acid is partially ionised in solution in water.

C There is a large amount of acid and a small amount of water.

D There is a large amount of water and a small amount of acid.

Q1218

The equation shows a reaction that involves both oxidation and reduction.

$$Fe_2O_3 + 2Al \longrightarrow Al_2O_3 + 2Fe$$

Which statement about **reduction** is correct?

A The gain of oxygen and the gain of electrons by a substance

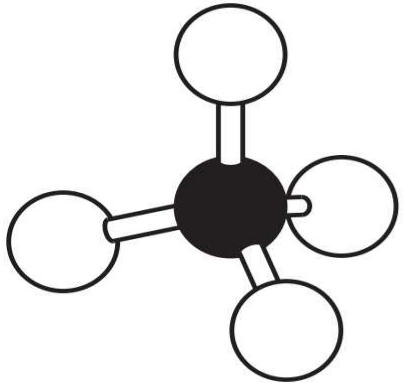
B The gain of oxygen and the loss of electrons by a substance

C The loss of oxygen and the gain of electrons by a substance

D The loss of oxygen and the loss of electrons by a substance

Q1518

Look at the diagram of a methane molecule.



Which statement about methane is correct?

A Electrons are transferred from hydrogen atoms to carbon atoms.

B The covalent bonds in methane are weak.

C The force of attraction between methane molecules is weak.

D The ionic bonds between carbon and hydrogen are very strong.

Q119

Which statement describes the **advantages** of instrumental methods of analysis?

A Instruments can analyse very small amounts and carry out the analyses slowly.

B Instruments are very accurate and use large amounts of substances.

C Instruments are very accurate and carry out the analyses slowly.

D Instruments are very accurate and can run all the time.

Q219

The table shows the composition of the Earth's early atmosphere compared with the atmosphere today.

	Nitrogen	**Oxygen**	**Argon**	**Carbon dioxide**
Percentage of gas in the early atmosphere	4	0.5	0.5	95
Percentage of gas in the atmosphere today	78	21	0.9	0.04

Which gas has **changed by the largest percentage** from the early atmosphere to the atmosphere today?

A Nitrogen

B Oxygen

C Argon

D Carbon dioxide

Q619

A student tests a solution for **chloride ions**.

She adds dilute nitric acid to the solution. She then adds a few drops of silver nitrate solution.

Why does she need to add dilute nitric acid in this test?

A To increase the pH of the solution.

B Nitrate ions are needed for the test to work.

C To make sure that no carbonate ions are present.

D The test only works in alkaline conditions.

Q919

A hydrogen-oxygen fuel cell produces electricity.

Hydrogen reacts with oxygen to produce water.

What is the equation for the reaction that happens at the **anode**?

A $2H_2(g) + O_2(g) \rightarrow 2H_2O(g)$

B $4H^+(aq) + 4e^- \rightarrow 2H_2(g)$

C $2H_2(g) \rightarrow 4H^+(aq) + 4e^-$

D $4H^+(aq) + O_2(g) + 4e^- \rightarrow 2H_2O(g)$

Q1319

Which statement explains why **polyamides** are condensation polymers?

A A molecule of water forms each time a hydroxyl link forms.

B A molecule of water forms each time an ester link forms.

C A molecule of water forms each time an amine group reacts with a carboxylic acid group.

D A molecule of water forms each time an alcohol group reacts with a carboxylic acid group.

Q1519

Which of the following is the expression used to calculate concentration in g/dm^3?

A $\text{Concentration} = \dfrac{\text{mass of solute in g}}{\text{volume of solution in } dm^3}$

B $\text{Concentration} = \dfrac{\text{mass of solvent in g}}{\text{volume of solution in } dm^3}$

C $\text{Concentration} = \text{mass of solute in g} \times \text{volume of solution in } dm^3$

D $\text{Concentration} = \dfrac{\text{mass of solute in g} \times \text{volume of solution in } dm^3}{1000}$

Q120

The formula of ammonium carbonate is $(NH_4)_2CO_3$.

What is the relative formula mass of ammonium carbonate?
(A_r: C = 12, H = 1, N = 14, O = 16)

A 78

B 90

C 96

D 120

Q220

Which purification technique is used to separate ethanol and water from a mixture?

A Chromatography

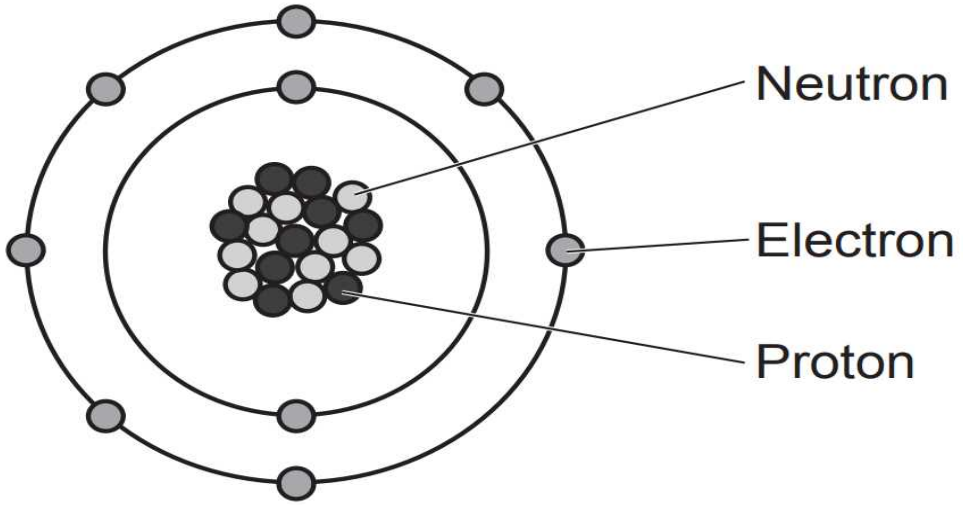
B Distillation

C Evaporation

D Filtration

Q620

The diagram shows an atom of an element.



What is the name of the element?

A Boron

B Beryllium

C Fluorine

D Neon

Q820

Ammonia has a simple molecular structure.

Which statement explains why ammonia has a low melting point and a low boiling point?

A The covalent bonds between the atoms are strong.

B The covalent bonds between the atoms are weak.

C The intermolecular forces between the molecules are strong.

D The intermolecular forces between the molecules are weak.

Q1020

Avogadro's constant has a value of 6.02×10^{23}.

What is the number of atoms in 0.5 mol of water?

A 2.00×10^{23}

B 3.01×10^{23}

C 6.02×10^{23}

D 9.03×10^{23}

Q1220

Sodium hydroxide reacts with hydrochloric acid. Sodium chloride and water are made.

$NaOH + HCl \rightarrow NaCl + H_2O$

What mass of sodium hydroxide would be needed to make 46.8 g of sodium chloride?

A 16 g

B 32 g

C 50 g

D 64 g

Q1520

Phosphoric acid contains phosphate ions, PO_4^{3-}.

Phosphoric acid is completely neutralised by sodium hydroxide.

What is the formula of the salt that is made?

A Na_2PO_4

B Na_3PO_4

C $Na(PO_4)_3$

D $Na_2(PO_4)_3$

Q121

Butane is a hydrocarbon molecule with a low boiling point.

Which statement about butane is correct?

A Butane is a large molecule and has strong intermolecular forces.

B Butane is a large molecule and has weak intermolecular forces.

C Butane is a small molecule and has strong intermolecular forces.

D Butane is a small molecule and has weak intermolecular forces.

Q221

Lumps of zinc react with dilute sulfuric acid.

What change would **decrease** the rate of this reaction?

A Further diluting the sulfuric acid with water.

B Using a larger volume of sulfuric acid.

C Using warmer sulfuric acid.

D Using zinc powder instead of zinc lumps.

Q421

What are the conditions usually used for the production of ammonia in the Haber process?

$N_2 + 3H_2 \rightleftharpoons 2NH_3$

A 200 °C, 450 atmospheres pressure and an iron catalyst

B 450 °C, 2 atmospheres pressure and a vanadium(V) oxide catalyst

C 450 °C, 200 atmospheres pressure and an iron catalyst

D 450 °C, 200 atmospheres pressure and a nickel catalyst

Q621

When iron rusts it forms hydrated iron(III) oxide.

$4Fe + 3O_2 \rightarrow 2Fe_2O_3$

What happens to iron in this reaction?

A Iron is decomposed.

B Iron is neutralised.

C Iron is oxidised.

D Iron is reduced.

Q1221

Which of these functional groups can react together to form a **condensation** polymer?

A –C=C– and –COOH

B –C=C– and $–NH_2$

C –COOH and $–NH_2$

D –OH and $–NH_2$

Q1321

An alcohol and a carboxylic acid react to form an ester and water in an equilibrium reaction.

alcohol + carboxylic acid $\rightleftharpoons$ ester + water

Why is an acid catalyst used in this reaction?

A The catalyst is changed chemically during the reaction.

B The equilibrium concentration of the ester is increased.

C The purity of the ester is increased.

D The time taken to reach equilibrium is decreased.

Q1421

Fertilisers can be made in a batch process in the laboratory or in a continuous process in industry.

The table gives some information about these two processes.

	Batch process	**Continuous process**
A	Easily automated	High production rate
B	Frequent shut-down periods	Large number of workers
C	Low production rate	High relative cost of equipment
D	Small number of workers	Low relative cost of equipment

Which row of the table is correct about the processes?

Q122

Large molecules produced by fractional distillation are cracked to make smaller molecules.

Octane, C_8H_{18}, is cracked to form ethene, C_2H_4, and one other product.

What is the formula of the other product?

A C_3H_6

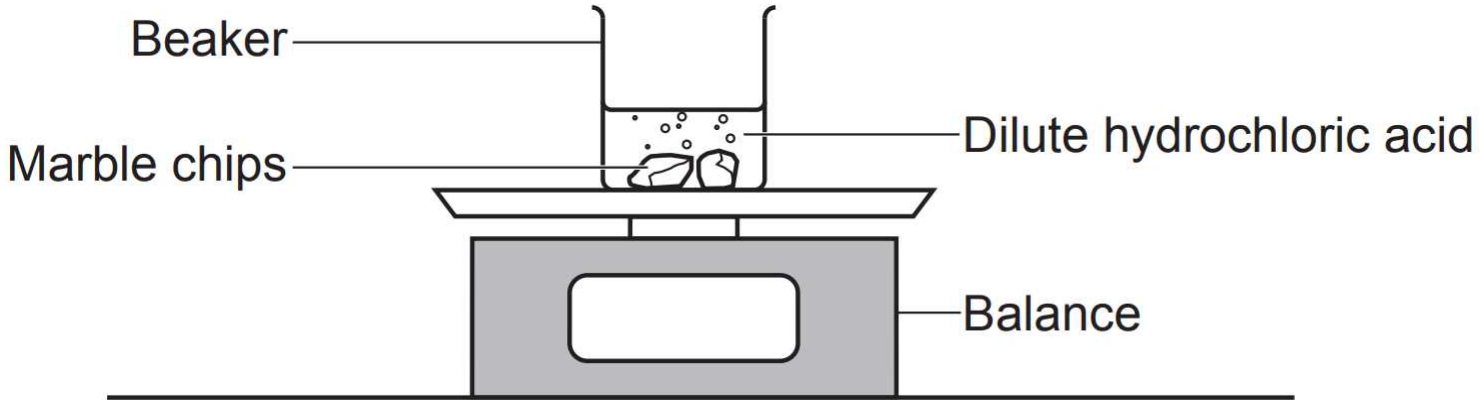
B C_6H_{12}

C C_6H_{14}

D C_8H_{16}

Q222

Dilute hydrochloric acid reacts with marble chips.



Which statement about the reaction is correct?

A The reaction is faster after 10 seconds than it is after 3 seconds.

B The reaction slows down with time.

C The reaction proceeds at a constant rate.

D The mass of the beaker and its contents stay the same.

Q722

The table shows some of the advantages and disadvantages of using hydrogen/oxygen fuel cells to power vehicles.

	Advantage	Disadvantage
A	do not produce greenhouse gases	hydrogen fuel comes from hydrocarbons, which are fossil fuels
B	hydrogen fuel comes from the electrolysis of water, which uses electricity	no moving parts
C	hydrogen is a gas and stored in a large tank	hydrogen is explosive
D	only by-products are water and heat	fuel cells do not go 'flat'

Which row in the table is correct?

Q1022

Which statement about polymerisation is correct?

A Amino acid monomers make polymers called proteins by addition polymerisation.

B DNA is a polymer made from four identical monomers called nucleotides.

C Polyesters are condensation polymers made from monomers containing carboxylic acid and alcohol functional groups.

D Poly(ethene) is a polymer made from ethene monomers by condensation polymerisation.

Q1322

Phytoextraction is used to extract metals from their compounds.

Which statement about phytoextraction is correct?

A Involves growing plants in soil that contains metal compounds

B Involves heating the metal compounds with carbon

C Uses bacteria to separate metals from their compounds

D Uses electricity to separate metals from their compounds

Q1522

How is iron protected from corrosion by sacrificial protection?

A Iron is coated in a more reactive metal, like magnesium, which is more readily reduced than iron.

B Iron is coated in a more reactive metal, like tin, which loses electrons more readily than iron.

C Iron is coated in a more reactive metal, like zinc, which gains electrons more readily than iron.

D Iron is coated in a more reactive metal, like zinc, which is more readily oxidised than iron.

Q123

Crude oil is a resource that is being made extremely slowly.

Which word describes a resource that is being made extremely slowly?

A Finite

B Hydrocarbon

C Non-renewable

D Petrochemical

Q223

The Group 7 element fluorine is a gas at room temperature and pressure.

The Group 7 elements show a trend in boiling points going down the group.

Which row shows the boiling points of the Group 7 elements?

	Boiling Point (°C)			
	Fluorine	**Chlorine**	**Bromine**	**Iodine**
A	–188	59	184	–15
B	–188	–34	59	184
C	188	184	59	–15
D	–15	184	188	59

Q323

Copper can be extracted from copper ore by heating the copper ore with carbon.

Copper can also be extracted by bioleaching.

What is an **advantage** of bioleaching?

A It can produce sulfuric acid.

B It extracts copper, which is then purified by electrolysis.

C It is done at low temperatures.

D It is slow.

Q523

This is the balanced symbol equation for the reaction of copper oxide with carbon.

$$2CuO + C \longrightarrow 2Cu + CO_2$$

What happens to the copper oxide in this reaction?

A It is neutralised.

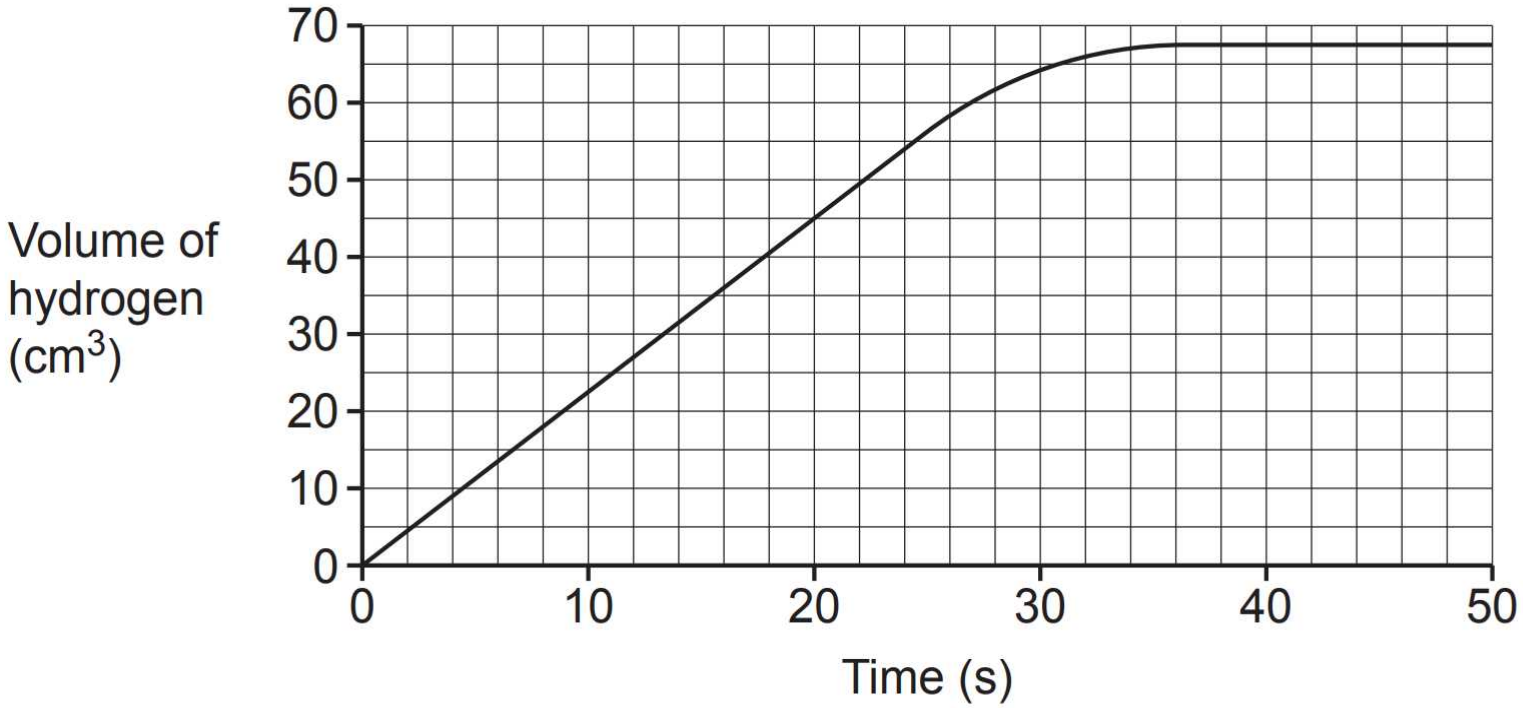
B It is oxidised.

C It is reduced.

D It is thermally decomposed.

Q723

The graph shows the volume of hydrogen gas made in an experiment.



What is the rate of reaction when the time is 20 s?

A 0.44 cm^3/s

B 2.25 cm^3/s

C 25 cm^3/s

D 900 cm^3/s

Q923

Which statement about chemical cells is correct?

A They produce a voltage indefinitely.

B They produce a voltage once all of the reactants are used up.

C They produce a voltage until one of the reactants is completely used up.

D They produce a voltage until the reactants are partly used up.

Q1123

Which statement about the greenhouse effect is correct?

A Greenhouse gases absorb all the infrared radiation that is emitted by the Earth's surface.

B Greenhouse gases make up a large percentage of the Earth's current atmosphere.

C The greenhouse effect is caused by the absorption and reflection of infrared radiation by greenhouse gases.

D The higher the concentration of greenhouse gases in the Earth's atmosphere, the colder the Earth is likely to become.

Q1223

Ethane is a very small hydrocarbon molecule.

Which row about ethane is correct?

	Easy to ignite?	Boiling point
A	✓	high
B	✗	high
C	✓	low
D	✗	low

Q1523

What is the half equation for the reaction at the **anode** in a hydrogen/oxygen fuel cell?

A $2H_2 + O_2 \rightarrow 2H_2O$

B $2H_2 \rightarrow 4H^+ + 4e^-$

C $4H^+ + 4e^- \rightarrow 2H_2$

D $4H^+ + O_2 + 4e^- \rightarrow 2H_2O$