a

What is an oxidation reaction? (in terms of oxygen transfer)

_____

_____

Write an equation to show an oxidation reaction.

What is a reduction reaction?

_____

_____

Write an equation to show a reduction reaction.

b

Place the following metals in order of reactivity – adding the names to the symbols.

Na, Zn, Fe, Cu, Li, K, Mg, Ca

Why are hydrogen and carbon sometimes included in the reactivity series?

_____

_____

Place arrows on the reactivity series where hydrogen and carbon could go.

Why is gold often found in its pure state?

_____

c

Complete the word equations.

zinc carbonate + sulfuric acid →

magnesium oxide + hydrochloric acid →

magnesium carbonate + nitric acid →

calcium carbonate + hydrochloric acid →

d

Describe what a metal reacting with an acid can tell you about the reactivity of the metal.

acid + metal → salt + hydrogen

_____

_____

_____

_____

_____

e

On the pH scale, label:

strong acid;
strong alkali;
neutral;
weak acid;
weak alkali.

What does the pH show?

_____

f

Some metals react with water to produce

_____

Some metals react with acid to produce

_____

g

To measure pH you can use... **(select two)**

universal indicator
Litmus paper
iodine
methylene blue
Benedict's solution
pH meter

h

Describe how to make a soluble salt from an insoluble base.

1. Choose an a_____.
2. Choose an i_____ base.
3. Warm the a_____.
4. Add the insoluble base to the acid until there is no further r_____.
5. F_____ the mixture.
6. Heat the solution to e_____ the water.
7. C_____ of salt will start to form.

i

Complete the neutralisation reaction.

acid + base → s_____ + w_____

H^+ (aq) + OH- (aq) → _____.

What is the pH of the products of a neutralisation reaction?

a) 1 b) 7 c) 14

j

Complete the following:

O _____

I _____

L _____

R _____

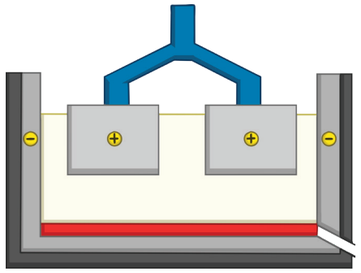
I _____

G _____

_____ is the loss of electrons and _____ is the gaining of electrons.

a

Describe how aluminium is extracted by electrolysis.



Why is aluminium oxide mixed with cryolite?

What is the overall equation for the electrolysis of Al_2O_3 to make aluminium and oxygen?

Why can aluminium not be extracted by carbon?

Write the equation for the reaction at the negative electrode.

Write the equation for the reaction at the positive electrode.

b

In which of the following reactions will a displacement reaction occur?

copper oxide + magnesium

magnesium oxide + iron

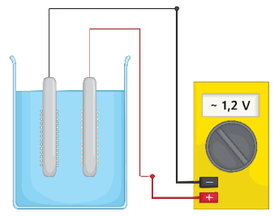
potassium oxide + zinc

zinc oxide + lithium

Why do some of them not work?

c

Describe what happens during the process of electrolysis.



d

The pH of an acid or alkali is a measure of the concentration of _____ ions.

A pH change from 4 to 2 increases H+ concentration by a factor of...

a) 10 b) 100 c) 1000

(choose the correct answer)

The pH of a strong acid is _____ than the pH of a weaker acid if they have the same _____.

Acids produce _____ in aqueous solutions.

Alkalis produce _____ in aqueous solutions.

e

In copper sulfate solution what forms at the:

cathode _____ anode _____

Why?

In sodium chloride solution what forms at the:

cathode _____ anode _____

Why?

What are the tests for:

chlorine;

hydrogen;

oxygen?

f

Strong acids are completely/partially ionised in an aqueous solution

A weak acid is completely/partially ionised in an aqueous solution.

The concentration of an acid is

g

I understand the following topic

I need to work on the following topic

a

Describe how you would carry out a titration reaction between sulfuric acid and sodium hydroxide.

b

Complete the risk assessment below.

Hazard	Risk	Emergency Procedure
_____	irritant	_____ _____
phenolphthalein solution	toxic	Inform teacher immediately.
_____	_____	_____ _____

c

$34.8cm^3$ of sodium hydroxide (NaOH) was neutralised by $50.0cm^3$ of hydrochloric acid (HCl), with a concentration of 0.150 mol/dm^3. Find the concentration of the sodium hydroxide.

$HCl + NaOH \longrightarrow H_2O + NaCl$

a

What is an oxidation reaction? (in terms of oxygen transfer)

The gaining of oxygen in a reaction.

Write an equation to show an oxidation reaction.

e.g. copper + oxygen → copper oxide

What is a reduction reaction?

The loss of oxygen in a reaction.

Write an equation to show a reduction reaction.

e.g. magnesium oxide → magnesium + oxide

b

Place the following metals in order of reactivity – adding the names to the symbols.

Na, Zn, Fe, Cu, Li, K, Mg, Ca

potassium	sodium	lithium	calcium	magnesium	zinc	iron	copper

carbon hydrogen

Why are hydrogen and carbon sometimes included in the reactivity series?

They are used in the extraction of the metals.

Place arrows on the reactivity series where hydrogen and carbon could go.

Why is gold often found in its pure state?

Gold is a very unreactive metal.

c

Complete the word equations.

zinc carbonate + sulfuric acid → **zinc sulfate + water + carbon dioxide**

magnesium oxide + hydrochloric acid → **magnesium chloride + water**

magnesium carbonate + nitric acid → **magnesium nitrate + water + carbon dioxide**

calcium carbonate + hydrochloric acid → **calcium chloride + water + carbon dioxide**

d

Describe what a metal reacting with an acid can tell you about the reactivity of the metal.

acid + metal → salt + hydrogen

The speed of a reaction is shown by the rate that hydrogen gas is given off by the reaction.

The more reactive the metal, the faster the reaction will be.

Slow reactions: copper, zinc, iron

Quick reactions: potassium, sodium, lithium

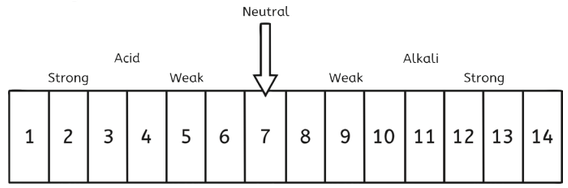
e

On the pH scale, label:

strong acid; **(0 - 3)**
strong alkali; **(12 - 14)**
neutral; **(7)**
weak acid; **(4 - 6)**
weak alkali. **(8 - 11)**

What does the pH show?

The measure of H^+ ions in the solution.



f

Some metals react with water to produce
metal hydroxide and hydrogen

Some metals react with acid to produce
salt and hydrogen

g

To measure pH you can use... **(select two)**

universal indicator
pH meter

h

Describe how to make a soluble salt from an insoluble base.

1. Choose an **acid.**
2. Choose an **insoluble** base.
3. Warm the **acid.**
4. Add the insoluble base to the acid until there is no further **reaction.**
5. **Filter** the mixture.
6. Heat the solution to **evaporate** the water.
7. **Crystals** of salt will start to form.

i

Complete the neutralisation reaction.

acid + base → **salt** + **water**

H^+ (aq) + OH- (aq) → **H_2O (l)**

What is the pH of the products of a neutralisation reaction?

a) 1 **b) 7** c) 14

j

Complete the following:

Oxidation

Is

Loss

Reduction

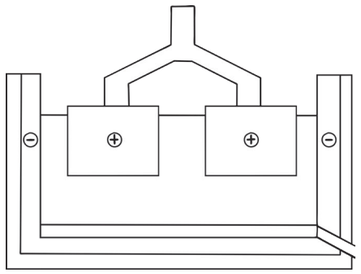
Is

Gain

Oxidation is the loss of electrons and **reduction** is the gaining of electrons.

a

Describe how aluminium is extracted by electrolysis.



The positive Al^{3+} ions are attracted to the negative electrode (cathode) where they gain electrons (3) – making them neutral. The negative O^{2-} ions are attracted to the positive electrode (anode) where they lose electrons (2) – making them neutral.

Why is aluminium oxide mixed with cryolite?

To lower the melting point.

What is the overall equation for the electrolysis of Al_2O_3 to make aluminium and oxygen?

aluminium oxide → aluminium + oxygen

$2Al_2O_3 \rightarrow 4Al + 3O_2$

Why can aluminium not be extracted by carbon?

Aluminium is more reactive than carbon so cannot be displaced.

Write the equation for the reaction at the negative electrode.

$Al^{3+} + 3e^- \rightarrow Al$

Write the equation for the reaction at the positive electrode.

$2O^{2-} \rightarrow O_2 + 4e^-$

b

Which of the following reactions will occur? (displacement)

copper oxide + magnesium

magnesium oxide + iron

potassium oxide + zinc

zinc oxide + lithium

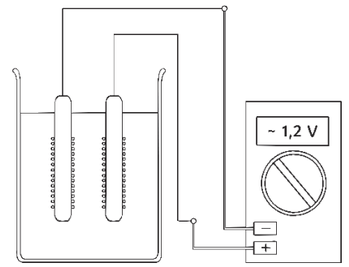
Why do some of them not work?

The metal has to be more reactive than the metal in the compound to take its place.

c

Describe what happens during the process of electrolysis.

When electricity is passed through the solution, the positive ions in the solution go towards the negative electrode where they gain electrons. The negative ions go towards the positive electrode where they lose electrons.



d

The pH of an acid or alkali is a measure of the concentration of H^+ ions.

A pH change from 4 to 2 increases H+ concentration by a factor of...

a) 10 **b) 100** c) 1000

(choose the correct answer)

The pH of a strong acid is **less** than the pH of a weaker acid if they have the same **concentration.**

Acids produce H^+ in aqueous solutions.

Alkalis produce OH^- in aqueous solutions.

e

In copper sulfate solution what forms at the:

cathode	anode
copper	**oxygen and water**

Why?

Copper is less reactive than hydrogen so copper is formed.

In sodium chloride solution what forms at the:

cathode	anode
hydrogen	**chlorine**

Why?

Sodium more reactive than hydrogen so hydrogen is formed.

What are the tests for:

chlorine;

bleaches damp litmus paper

hydrogen;

squeaky pop test

oxygen?

relight a glowing splint

f

Strong acids are **completely**/partially ionised in an aqueous solution

A weak acid is completely/**partially** ionised in an aqueous solution.

The concentration of an acid is

a measure of the number of hydrogen ions in a solution.

g

I understand the following topic

_____

_____

_____

I need to work on the following topic

_____

_____

_____

a

Describe how you would carry out a titration reaction between sulfuric acid and sodium hydroxide.

1. **Using the pipette and pipette filler, measure 25cm^3 sodium hydroxide solution and pour into a conical flask.**
2. **Add several drops of phenolphthalein to the sodium hydroxide solution.**
3. **Swirl the flask and the mixture should be pink.**
4. **Place the conical flask on a white tile.**
5. **Place the burette into its stand, ensuring the tap is closed. Using the funnel, fill the burette with sulfuric acid to the 0cm^3 line. Should you go above this line, open the tap and allow the excess to run off into a beaker.**
6. **Once the burette is correctly filled, place over the conical flask.**
7. **Carefully open the tap so the acid flows slowly into the conical flask. Swirl the flask and look for the indicator changing from pink to colourless.**
8. **Continue adding the acid to the flask until the indicator is permanently colourless.**
9. **Record the total volume of acid added to the sodium hydroxide in the results table.**
10. **Repeat the experiment twice more.**

b

Complete the risk assessment below.

Hazard	Risk	Emergency Procedure
sodium hydroxide solution	irritant	**Wash off skin immediately and inform the teacher.**
phenolphthalein solution	toxic	Inform teacher immediately.
sulfuric acid	**irritant**	**Wash off skin and inform teacher.**

c

34.8cm^3 of sodium hydroxide (NaOH) was neutralised by 50.0cm^3 of hydrochloric acid (HCl), with a concentration of 0.150 mol/dm^3. Find the concentration of the sodium hydroxide.

$HCl + NaOH \longrightarrow H_2O + NaCl$

volume of acid: 50.0cm^3

concentration of acid: 0.150mol/dm^3

volume of alkali: 34.8cm^3

concentration of alkali: ?

volume of acid: 50.00cm^3 ÷ 1000 = 0.05dm^3

volume of alkali: 34.80cm^3 ÷ 1000 = 0.0348dm^3

amount in mol = volume in dm^3 × concentration in mol/dm^3

amount in mol (acid): 0.05 × 0.150 = 0.0075mol

from the equation: 1mol acid (HCl) : 1mol alkali (NaCl)

amount in mol (acid): 0.0075mol

concentration in mol/dm^3 = amount in mol ÷ volume in dm^3

0.0075 ÷ 0.0348 = 0.22mol/dm^3