Chapter 5

Electricity and chemistry

5.1 Electricity and chemistry

01. 0620_m21_qp_22 Q: 9

The ionic half-equation for the formation of oxygen during the electrolysis of aluminium oxide is shown.

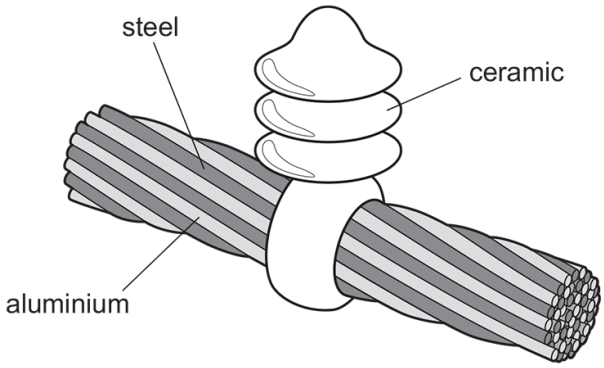
$$x O^{2-} \rightarrow O_2 + y e^-$$

What are the values of *x* and *y*?

	x	*y*
A	1	2
B	1	4
C	2	2
D	2	4

02. 0620_m21_qp_22 Q: 11

The diagram shows a section of an overhead power cable.



Which statement explains why a particular substance is used?

A Aluminium has a low density and is a good conductor of electricity.

B Ceramic is a good conductor of electricity.

C Steel can rust in damp air.

D Steel is more dense than aluminium.

03. 0620_m21_qp_22 Q: 12

During the electrolysis of dilute sulfuric acid, hydrogen is collected at the cathode.

What is the ionic half-equation for this reaction?

A $H^+ + e^- \rightarrow H$

B $H^+ \rightarrow H + e^-$

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

D $2H^+ \rightarrow H_2 + 2e^-$

---

04. 0620_s21_qp_21 Q: 10

In separate experiments, electricity was passed through concentrated aqueous sodium chloride and molten lead(II) bromide.

What would happen in **both** experiments?

A A halogen would be formed at the anode.

B A metal would be formed at the cathode.

C Hydrogen would be formed at the anode.

D Hydrogen would be formed at the cathode.

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05. 0620_s21_qp_21 Q: 11

What is the ionic half-equation for the reaction that occurs at the cathode when molten lead(II) bromide is electrolysed?

A $Pb^{2+} + 2e^- \rightarrow Pb$

B $2Br^- \rightarrow Br_2 + 2e^-$

C $Br_2 + 2e^- \rightarrow 2Br^-$

D $Pb \rightarrow Pb^{2+} + 2e^-$

---

06. 0620_s21_qp_22 Q: 10

In separate experiments, electricity was passed through concentrated aqueous sodium chloride and molten lead(II) bromide.

What would happen in **both** experiments?

A A halogen would be formed at the anode.

B A metal would be formed at the cathode.

C Hydrogen would be formed at the anode.

D Hydrogen would be formed at the cathode.

---

07. 0620_s21_qp_22 Q: 11

A reaction involving aluminium is shown.

$$xAl + yO_2 + 6H_2O \rightarrow xAl(OH)_3$$

Which values of x and y balance the equation?

	x	y
A	2	3
B	3	2
C	3	4
D	4	3

---

08. 0620_s21_qp_23 Q: 10

In separate experiments, electricity was passed through concentrated aqueous sodium chloride and molten lead(II) bromide.

What would happen in **both** experiments?

A A halogen would be formed at the anode.

B A metal would be formed at the cathode.

C Hydrogen would be formed at the anode.

D Hydrogen would be formed at the cathode.

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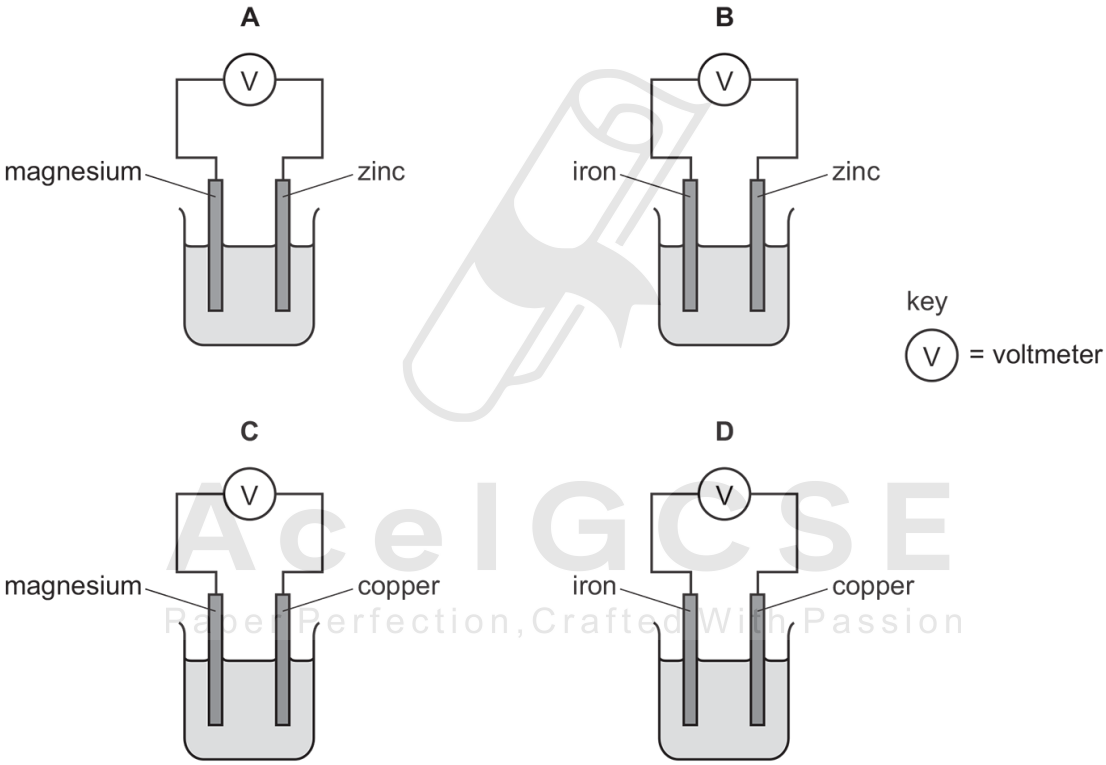
09. 0620_s21_qp_23 Q: 13

Which simple cell produces the most electrical energy?



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10. 0620_w21_qp_21 Q: 10

Which statements about the products of electrolysis, using inert electrodes, are correct?

1 When molten lead(II) bromide is electrolysed, bromine is formed at the cathode.

2 When dilute sulfuric acid is electrolysed, oxygen is formed at the anode.

3 When concentrated aqueous sodium chloride is electrolysed, sodium is formed at the cathode.

4 When concentrated hydrochloric acid is electrolysed, chlorine is formed at the anode.

A 1 and 2 **B** 1 and 3 **C** 2 and 4 **D** 3 and 4

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11. 0620_w21_qp_22 Q: 10

Iron can be electroplated with zinc to make it resistant to corrosion.

Which row about electroplating iron with zinc is correct?

	positive electrode (anode)	negative electrode (cathode)	electrolyte
A	iron	zinc	iron nitrate
B	iron	zinc	zinc nitrate
C	zinc	iron	iron nitrate
D	zinc	iron	zinc nitrate

---

12. 0620_w21_qp_22 Q: 13

Concentrated aqueous sodium chloride is electrolysed.

Which equation represents the reaction at the cathode?

A $Na^+ + e^- \rightarrow Na$

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

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

D $2Cl^- \rightarrow Cl_2 + 2e^-$

---

13. 0620_w21_qp_23 Q: 10

Effervescence is observed at the negative electrode (cathode) during the electrolysis of concentrated aqueous sodium chloride.

Which element is produced at the negative electrode (cathode)?

A chlorine

B hydrogen

C oxygen

D sodium

---

14. 0620_m20_qp_22 Q: 10

Which statements about the electrolysis of molten lead(II) bromide are correct?

1 Lead ions move to the anode and are oxidised.

2 Lead ions move to the cathode and are reduced.

3 Bromide ions move to the anode and are oxidised.

4 Bromide ions move to the cathode and are reduced.

A 1 and 3 **B** 1 and 4 **C** 2 and 3 **D** 2 and 4

---

15. 0620_m20_qp_22 Q: 11

Aqueous copper(II) sulfate is electrolysed using carbon electrodes.

Which statement is correct?

A Bubbles of hydrogen are formed at the anode.

B Bubbles of oxygen gas are formed at the cathode.

C Copper is deposited at the anode.

D The blue colour of the solution fades.

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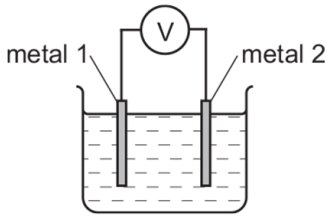
16. 0620_p20_qp_20 Q: 13

Different metals were tested using the apparatus shown.



Which pair of metals would produce the largest voltage?

A copper and silver

B magnesium and silver

C magnesium and zinc

D zinc and copper

---

17. 0620_p20_qp_20 Q: 14

Three electrolysis cells are set up. Each cell has inert electrodes.

The electrolytes are listed below.

cell 1	aqueous sodium chloride
cell 2	dilute sulfuric acid
cell 3	molten lead(II) bromide

In which of these cells is a gas formed at **both** electrodes?

A 1 and 2 **B** 1 and 3 **C** 2 only **D** 3 only

---

18. 0620_p20_qp_20 Q: 15

The statements refer to the electrolysis of concentrated copper(II) chloride solution.

1 Electrons are transferred from the cathode to the copper(II) ions.

2 Electrons move around the circuit from the cathode to the anode.

3 Chloride ions are attracted to the anode.

4 Hydroxide ions transfer electrons to the cathode.

Which statements about the electrolysis of concentrated copper(II) chloride are correct?

A 1 and 3

B 1 and 4

C 2 and 3

D 2 and 4

---

19. 0620_s20_qp_21 Q: 10

Dilute aqueous sodium chloride is electrolysed using platinum electrodes.

What is the half-equation for the reaction at the cathode?

A $2H^+ + 2e^- \rightarrow H_2$

B $Na^+ + e^- \rightarrow Na$

C $2Cl^- \rightarrow Cl_2 + 2e^-$

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

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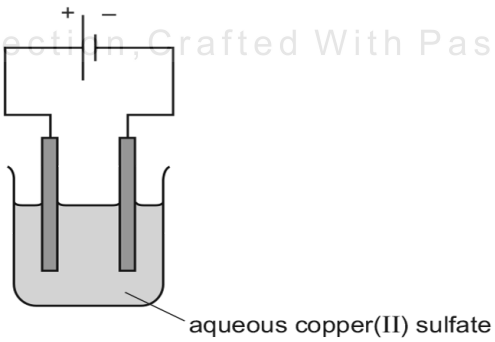
20. 0620_s20_qp_21 Q: 11

The electrolysis of aqueous copper(II) sulfate, using inert electrodes, is shown.



Which statement about a reaction at an electrode is correct?

A Copper ions gain electrons at the negative electrode.

B Copper ions gain electrons at the positive electrode.

C Hydrogen ions gain electrons at the negative electrode.

D Hydrogen ions gain electrons at the positive electrode.

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21. 0620_s20_qp_22 Q: 10

Electrolytes can be broken down by electrolysis.

Which rows are correct for each electrolyte?

	electrolyte	reaction at cathode	product at anode
1	dilute aqueous sodium chloride	$2H^+ + 2e^- \rightarrow H_2$	oxygen
2	concentrated hydrochloric acid	$2H^+ + 2e^- \rightarrow H_2$	chlorine
3	molten aluminium oxide	$2O^{2-} \rightarrow O_2 + 4e^-$	aluminium
4	concentrated aqueous sodium bromide	$Na^+ + e^- \rightarrow Na$	bromine

A 1 and 2 **B** 1 and 4 **C** 2 and 3 **D** 3 and 4

---

22. 0620_s20_qp_23 Q: 10

Which row describes the reactions during the electrolysis of dilute aqueous sodium chloride?

	anode (+) reaction	cathode (–) reaction
A	$H_2 \rightarrow 2H^+ + 2e^-$	$2H_2O + O_2 + 4e^- \rightarrow 4OH^-$
B	$2H^+ + 2e^- \rightarrow H_2$	$4OH^- \rightarrow 2H_2O + O_2 + 4e^-$
C	$2H_2O + O_2 + 4e^- \rightarrow 4OH^-$	$H_2 \rightarrow 2H^+ + 2e^-$
D	$4OH^- \rightarrow 2H_2O + O_2 + 4e^-$	$2H^+ + 2e^- \rightarrow H_2$

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23. 0620_w20_qp_21 Q: 14

Which reaction takes place at the cathode during the electrolysis of molten nickel(II) chloride?

A $Cl_2 + 2e^- \rightarrow 2Cl^-$

B $2Cl^- \rightarrow Cl_2 + 2e^-$

C $Ni \rightarrow Ni^{2+} + 2e^-$

D $Ni^{2+} + 2e^- \rightarrow Ni$

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24. 0620_w20_qp_22 Q: 12

Universal indicator solution is added to a neutral solution of concentrated aqueous sodium chloride.

The solution, which contains H^+ (hydrogen), Na^+ (sodium), Cl^- (chloride) and OH^- (hydroxide) ions, is electrolysed.

The product at the cathode is hydrogen gas and the product at the anode is chlorine gas.

What happens to the colour of the indicator **in the solution** during electrolysis?

A The colour changes from blue to green.

B The colour changes from blue to red.

C The colour changes from green to blue.

D The colour changes from green to red.

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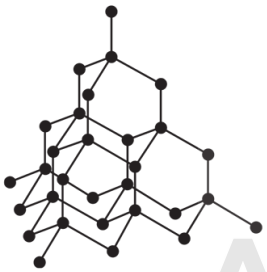
25. 0620_w20_qp_22 Q: 29

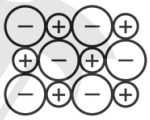
Which diagram best represents the structure of a substance that is a good conductor of electricity at 25 °C?

A

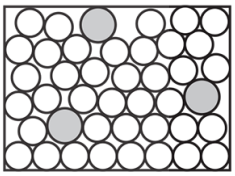


B

C



D



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26. 0620_w20_qp_23 Q: 13

Electrolysis is carried out on dilute aqueous potassium bromide.

Which products are formed at the anode and the cathode?

	anode	cathode
A	bromine	hydrogen
B	bromine	potassium
C	hydrogen	bromine
D	hydrogen	potassium

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27. 0620_m19_qp_22 Q: 10

Which substance is **not** produced during the electrolysis of concentrated aqueous sodium chloride?

A chlorine

B hydrogen

C sodium

D sodium hydroxide

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28. 0620_m19_qp_22 Q: 11

Aqueous copper(II) sulfate is electrolysed using copper electrodes.

What are the ionic half-equations for the reactions that occur at each electrode?

	anode	cathode
A	$Cu \rightarrow Cu^{2+} + 2e^-$	$Cu^{2+} + 2e^- \rightarrow Cu$
B	$Cu^{2+} + 2e^- \rightarrow Cu$	$Cu \rightarrow Cu^{2+} + 2e^-$
C	$4OH^- \rightarrow 2H_2O + O_2 + 4e^-$	$Cu^{2+} + 2e^- \rightarrow Cu$
D	$4OH^- \rightarrow 2H_2O + O_2 + 4e^-$	$2H^+ + 2e^- \rightarrow H_2$

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29. 0620_s19_qp_21 Q: 9

Which statement about the electrolysis of copper(II) sulfate solution using carbon electrodes is correct?

A A colourless gas is produced at the anode.

B A colourless gas is produced at the cathode.

C The colour of the electrolyte remains the same.

D The mass of both electrodes remains constant.

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30. 0620_s19_qp_21 Q: 10

Aluminium metal is extracted from aluminium oxide by electrolysis.

Which ionic half-equation describes a reaction that occurs at the named electrode?

	ionic half-equation	electrode
A	$2O^{2-} \rightarrow O_2 + 2e^-$	anode
B	$Al^{3+} + 3e^- \rightarrow Al$	anode
C	$2O^{2-} \rightarrow O_2 + 4e^-$	cathode
D	$Al^{3+} + 3e^- \rightarrow Al$	cathode

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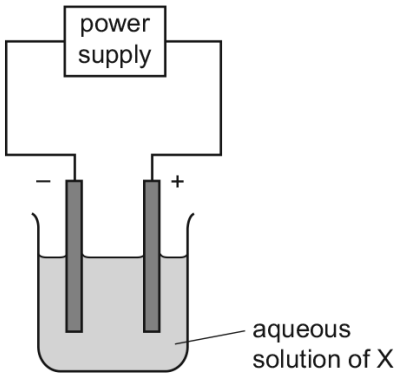
31. 0620_s19_qp_22 Q: 9

The diagram shows the electrolysis of an aqueous solution of X using inert electrodes.



Hydrogen is produced at the cathode and chlorine is produced at the anode.

What is X?

A concentrated copper(II) chloride solution

B concentrated hydrochloric acid

C dilute hydrochloric acid

D dilute sodium chloride solution

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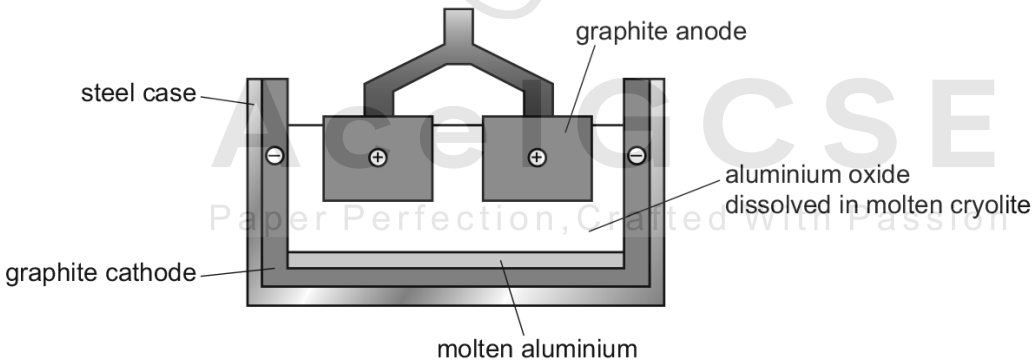
32. 0620_s19_qp_22 Q: 10

Aluminium is extracted by electrolysis as shown.



Which row shows the ionic half-equations at the cathode and the anode?

	cathode	anode
A	$Al^{3+} \rightarrow Al + 3e^-$	$2O^{2-} \rightarrow O_2 + 4e^-$
B	$Al^{3+} \rightarrow Al + 3e^-$	$2O^{2-} + 4e^- \rightarrow O_2$
C	$Al^{3+} + 3e^- \rightarrow Al$	$2O^{2-} \rightarrow O_2 + 4e^-$
D	$Al^{3+} + 3e^- \rightarrow Al$	$2O^{2-} + 4e^- \rightarrow O_2$

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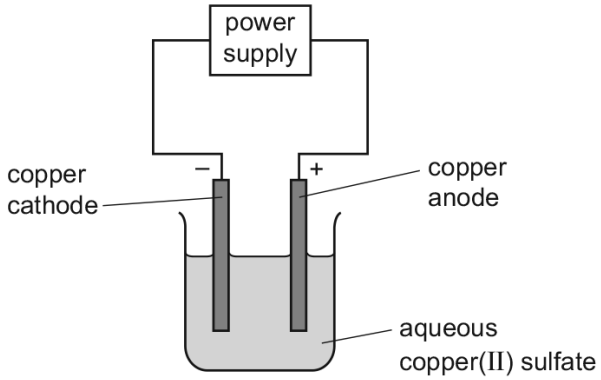
33. 0620_s19_qp_23 Q: 9

An aqueous solution of copper(II) sulfate was electrolysed using copper electrodes.



Which equation for the reaction at the anode is correct?

A $Cu \rightarrow Cu^{2+} + 2e^-$

B $Cu + 2e^- \rightarrow Cu^{2+}$

C $Cu^{2+} \rightarrow Cu + 2e^-$

D $Cu^{2+} + 2e^- \rightarrow Cu$

---

34. 0620_s19_qp_23 Q: 10

In the manufacture of aluminium by electrolysis, aluminium oxide is dissolved in molten cryolite.

Why is cryolite used?

A It lowers the melting point of the aluminium.

B It makes the aluminium a better conductor.

C It removes impurities from the aluminium.

D The mixture has a lower melting point than pure aluminium oxide.

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35. 0620_w19_qp_21 Q: 11

Which rows correctly show cathode and anode products from the electrolysis of the named electrolyte?

	electrolyte	cathode product	anode product
1	copper(II) sulfate solution using copper electrodes	copper	oxygen
2	molten lead(II) bromide	lead	bromine
3	dilute sodium bromide solution	hydrogen	oxygen
4	copper(II) sulfate solution using carbon electrodes	hydrogen	oxygen

A 1 and 2 only **B** 1 and 4 only **C** 2 and 3 only **D** 3 and 4 only

---

36. 0620_w19_qp_21 Q: 12

What are the ionic half-equations for the electrode reactions during the electrolysis of concentrated aqueous sodium chloride?

	anode	cathode
A	$Cl_2 + 2e^- \rightarrow 2Cl^-$	$H_2 \rightarrow 2H^+ + 2e^-$
B	$2Cl^- \rightarrow Cl_2 + 2e^-$	$2H^+ + 2e^- \rightarrow H_2$
C	$H_2 \rightarrow 2H^+ + 2e^-$	$Cl_2 + 2e^- \rightarrow 2Cl^-$
D	$2H^+ + 2e^- \rightarrow H_2$	$2Cl^- \rightarrow Cl_2 + 2e^-$

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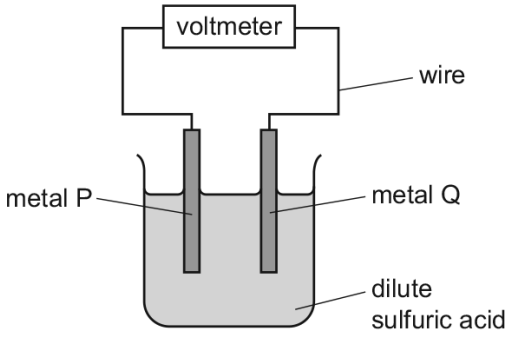
37. 0620_w19_qp_22 Q: 11

The diagram shows a simple cell.



Which pair of metals produces the largest voltage?

	metal P	metal Q
A	magnesium	iron
B	magnesium	copper
C	zinc	iron
D	zinc	copper

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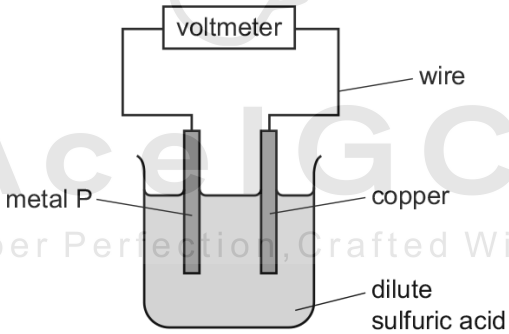
38. 0620_w19_qp_23 Q: 11

The diagram shows a simple cell.



Which metal P produces the smallest voltage?

A calcium

B iron

C magnesium

D zinc

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39. 0620_m18_qp_22 Q: 9

A solution of copper(II) sulfate can be electrolysed using copper electrodes or carbon electrodes.

Which statements are correct?

1 Using copper electrodes, oxygen gas forms at the anode.

2 Using copper electrodes, copper atoms lose electrons at the anode.

3 Using carbon electrodes, copper metal forms at the cathode.

4 Using carbon electrodes, copper ions gain electrons at the cathode.

A 1 and 2 **B** 1 and 3 **C** 2, 3 and 4 **D** 4 only

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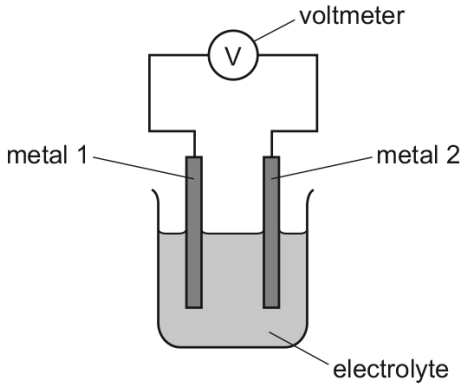
40. 0620_m18_qp_22 Q: 10

Pairs of metals are connected together to make a simple cell, as shown.



The table shows the reading on the voltmeter when different metals are used.

		metal 2			
		beryllium	cerium	cobalt	manganese
metal 1	beryllium	0.00 V	+0.64 V	–1.57 V	–0.67 V
	cerium		0.00 V	–2.21 V	–1.30 V
	cobalt			0.00 V	+0.90 V
	manganese				0.00 V

If metal 2 is more reactive than metal 1, the voltage measured is positive.

The greater the difference in reactivity of the metals, the larger the reading on the voltmeter.

What is the order of reactivity?

	most reactive → least reactive			
A	cerium	beryllium	cobalt	manganese
B	cerium	beryllium	manganese	cobalt
C	cobalt	manganese	beryllium	cerium
D	cobalt	manganese	cerium	beryllium

41. 0620_s18_qp_21 Q: 10

Aqueous copper(II) sulfate is electrolysed using copper electrodes.

Which statement is correct?

A A reduction reaction occurs at the positive electrode.

B The blue colour of the solution becomes darker.

C The concentration of copper ions in the solution decreases.

D The mass of the negative electrode increases.

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42. 0620_s18_qp_21 Q: 11

Dilute sulfuric acid is electrolysed using inert electrodes.

What are the ionic half-equations for the reactions that take place at each electrode?

	positive electrode	negative electrode
A	$2H^+ + 2e^- \rightarrow H_2$	$4OH^- \rightarrow 2H_2O + O_2 + 4e^-$
B	$2H^+ + 2e^- \rightarrow H_2$	$4OH^- + 4H^+ \rightarrow 4H_2O$
C	$4OH^- \rightarrow 2H_2O + O_2 + 4e^-$	$2H^+ + 2e^- \rightarrow H_2$
D	$4OH^- + 4H^+ \rightarrow 4H_2O$	$2H^+ + 2e^- \rightarrow H_2$

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43. 0620_s18_qp_22 Q: 10

Aqueous copper(II) sulfate is electrolysed using copper electrodes.

Which statement about the electrolysis is **not** correct?

A An oxidation reaction occurs at the positive electrode.

B The current is carried through the electrolyte by ions.

C The negative electrode gains mass.

D The number of copper(II) ions in the electrolyte decreases.

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44. 0620_w18_qp_21 Q: 10

Aqueous copper(II) sulfate is electrolysed using carbon electrodes.

What is the product at each electrode?

	product at the positive electrode	product at the negative electrode
A	copper	oxygen
B	hydrogen	oxygen
C	oxygen	copper
D	oxygen	hydrogen

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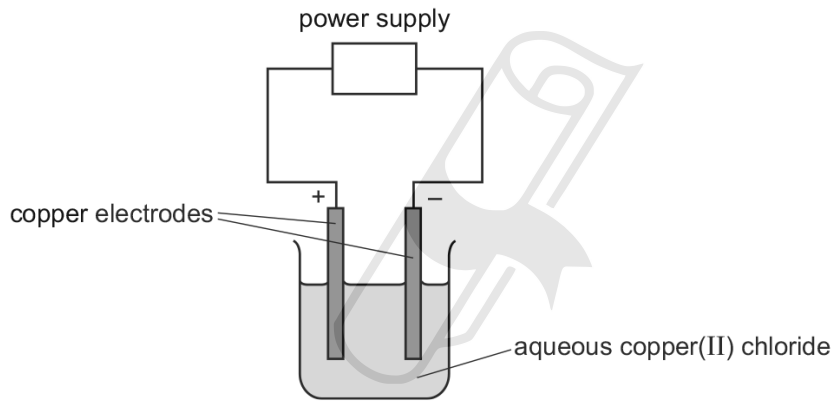
45. 0620_w18_qp_22 Q: 10

Concentrated aqueous copper(II) chloride is electrolysed using copper electrodes as shown.



What happens to the mass of each electrode during this process?

	positive electrode	negative electrode
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

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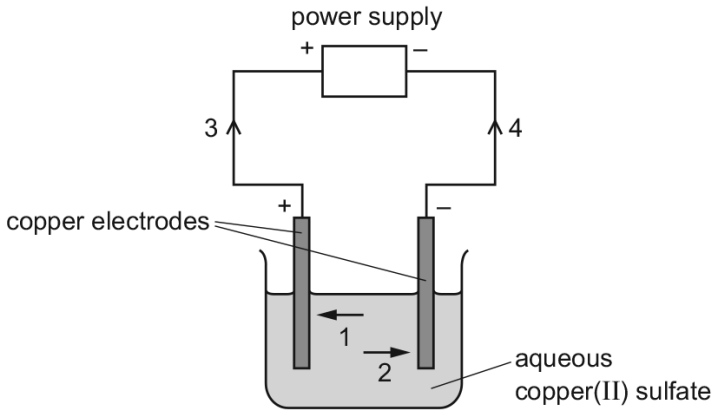
46. 0620_w18_qp_22 Q: 11

The diagram shows a circuit used to electrolyse aqueous copper(II) sulfate.



Which arrows indicate the movement of the copper ions in the electrolyte and of the electrons in the external circuit?

	copper ions	electrons
A	1	3
B	1	4
C	2	3
D	2	4

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47. 0620_w18_qp_23 Q: 10

Electrolysis of copper(II) sulfate can be done using either carbon electrodes or copper electrodes.

Which statement describes what happens at the positive electrode?

A Copper is deposited if the electrode is made from carbon.

B Copper is deposited if the electrode is made from copper.

C Oxygen gas is produced if the electrode is made from carbon.

D Oxygen gas is produced if the electrode is made from copper.

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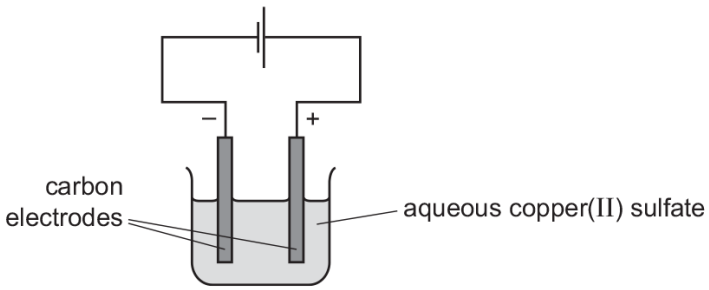
48. 0620_m17_qp_22 Q: 10

The diagram shows the electrolysis of aqueous copper(II) sulfate.



Which statement is correct?

A Copper metal is deposited at the positive electrode.

B In the external circuit the electrons move from positive to negative.

C In the solution the electrons move from negative to positive.

D Oxygen gas is produced at the positive electrode.

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49. 0620_m17_qp_22 Q: 11

Four solutions are separately electrolysed.

experiment	solution	electrodes
1	dilute aqueous sodium chloride	carbon
2	aqueous copper(II) sulfate	copper
3	concentrated hydrochloric acid	carbon
4	dilute sulfuric acid	carbon

In which two experiments is a colourless gas evolved at the anode?

A 1 and 2 **B** 1 and 4 **C** 2 and 3 **D** 3 and 4

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50. 0620_s17_qp_21 Q: 9

Which statement about electrolysis is correct?

A Electrons move through the electrolyte from the cathode to the anode.

B Electrons move towards the cathode in the external circuit.

C Negative ions move towards the anode in the external circuit.

D Positive ions move through the electrolyte towards the anode during electrolysis.

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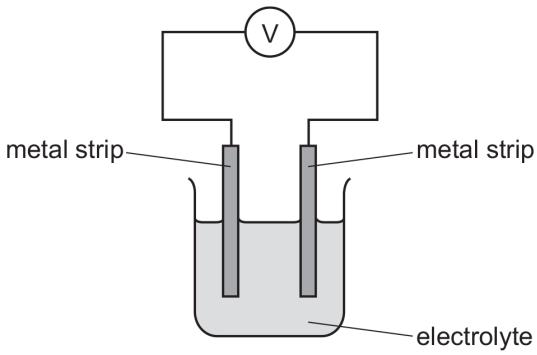
51. 0620_s17_qp_21 Q: 10

The reactivity series for a number of different metals is shown.

most reactive → least reactive					
magnesium	zinc	iron	copper	silver	platinum

The diagram shows different metal strips dipped into an electrolyte.



Which pair of metals produces the highest voltage?

A copper and magnesium

B magnesium and platinum

C magnesium and zinc

D silver and platinum

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52. 0620_w17_qp_21 Q: 9

Which statements about the electrolysis of concentrated copper(II) chloride are correct?

1 Electrons are transferred from the cathode to the copper(II) ions.

2 Electrons move round the external circuit from the cathode to the anode.

3 Chloride ions are attracted to the anode.

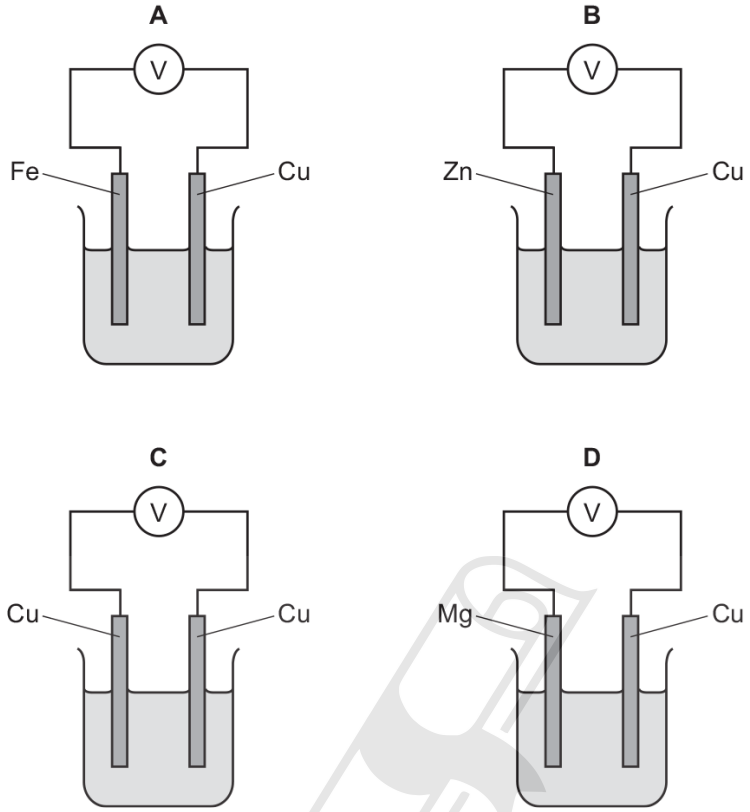
4 Hydroxide ions transfer electrons to the cathode.

A 1 and 3 **B** 1 and 4 **C** 2 and 3 **D** 2 and 4

---

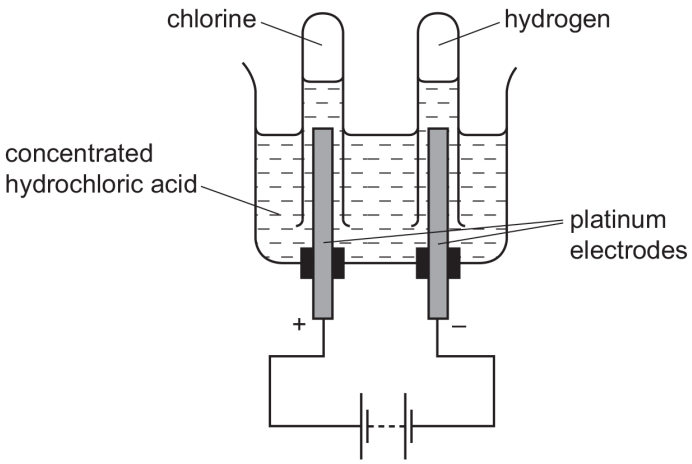
53. 0620_w17_qp_21 Q: 10

Which metal combination produces the highest voltage reading in the cells shown?



54. 0620_m16_qp_22 Q: 10

The electrolysis of concentrated hydrochloric acid is shown.



Which statement describes what happens to the electrons during the electrolysis?

A They are added to chloride ions.

B They are added to hydrogen ions.

C They move through the circuit from positive to negative.

D They move through the solution from negative to positive.

---

55. 0620_m16_qp_22 Q: 11

Which reaction does **not** occur in the extraction of aluminium?

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

B $2Al_2O_3 + 3C \rightarrow 4Al + 3CO_2$

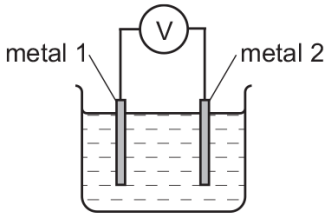
C $2O^{2-} \rightarrow O_2 + 4e^-$

D $C + O_2 \rightarrow CO_2$

---

56. 0620_p16_qp_20 Q: 13

Different metals were tested using the apparatus shown.



Which pair of metals would produce the largest voltage?

A copper and silver

B magnesium and silver

C magnesium and zinc

D zinc and copper

---

57. 0620_p16_qp_20 Q: 14

Three electrolysis cells are set up. Each cell has inert electrodes.

The electrolytes are listed below.

cell 1	aqueous sodium chloride
cell 2	dilute sulfuric acid
cell 3	molten lead(II) bromide

In which of these cells is a gas formed at **both** electrodes?

A 1 and 2 **B** 1 and 3 **C** 2 only **D** 3 only

---

58. 0620_p16_qp_20 Q: 15

The statements refer to the electrolysis of concentrated copper(II) chloride solution.

1 Electrons are transferred from the cathode to the copper(II) ions.

2 Electrons move around the circuit from the cathode to the anode.

3 Chloride ions are attracted to the anode.

4 Hydroxide ions transfer electrons to the cathode.

Which statements about the electrolysis of concentrated copper(II) chloride are correct?

A 1 and 3

B 1 and 4

C 2 and 3

D 2 and 4

---

59. 0620_s16_qp_21 Q: 10

Which reactions could take place at the anode during electrolysis?

1 $4OH^-(aq) \rightarrow 2H_2O(l) + O_2(g) + 4e^-$

2 $2Cl^-(aq) \rightarrow Cl_2(g) + 2e^-$

3 $Cu^{2+}(aq) + 2e^- \rightarrow Cu(s)$

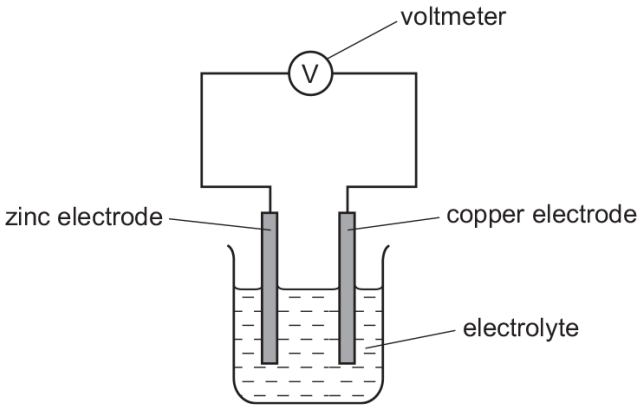
4 $2H^+(aq) + 2e^- \rightarrow H_2(g)$

A 1 and 2 **B** 1 and 4 **C** 2 and 4 **D** 3 and 4

---

60. 0620_s16_qp_21 Q: 12

The diagram shows a simple cell.



Which statement about the process occurring when the cell is in operation is correct?

A Cu^{2+} ions are formed in solution.

B Electrons travel through the solution.

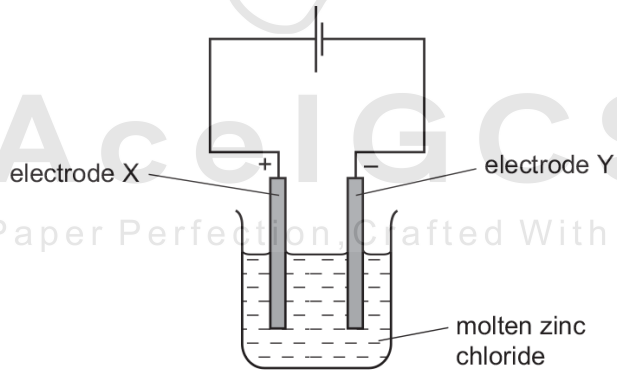
C The reaction $Zn \rightarrow Zn^{2+} + 2e^{-}$ occurs.

D The zinc electrode increases in mass.

---

61. 0620_s16_qp_22 Q: 10

The diagram shows the electrolysis of molten zinc chloride, $ZnCl_2$.



Which statement is correct?

A Oxidation occurs at electrode X and the equation is: $2Cl^{-} \rightarrow Cl_2 + 2e^{-}$.

B Oxidation occurs at electrode Y and the equation is: $Zn^{2+} + 2e^{-} \rightarrow Zn$.

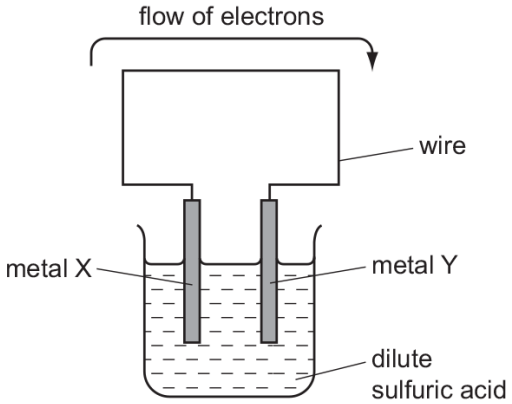
C Reduction occurs at electrode X and the equation is: $Zn^{2+} + 2e^{-} \rightarrow Zn$.

D Reduction occurs at electrode Y and the equation is: $2Cl^{-} \rightarrow Cl_2 + 2e^{-}$.

---

62. 0620_s16_qp_22 Q: 12

The diagram shows a simple cell.



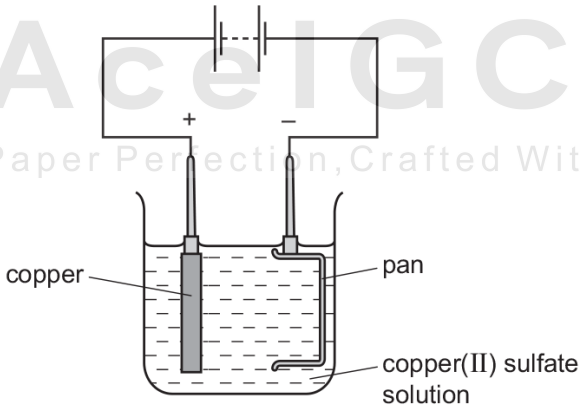
For which pair of metals would electrons flow from metal X to metal Y?

	X	Y
A	copper	iron
B	copper	zinc
C	iron	zinc
D	zinc	iron

---

63. 0620_s16_qp_23 Q: 10

The diagram shows a method used to copper-plate a pan



Which equation represents the reaction at the cathode?

A $Cu^{2+} + 2e^- \rightarrow Cu$

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

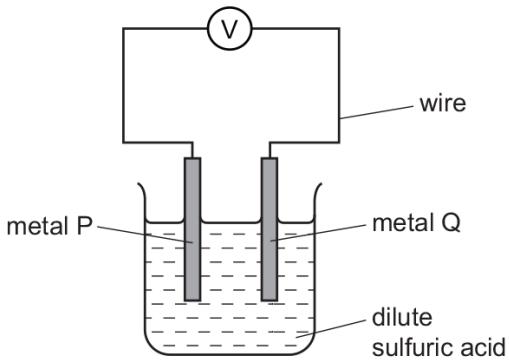
C $4OH^- \rightarrow O_2 + 2H_2O + 4e^-$

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

---

64. 0620_s16_qp_23 Q: 12

The diagram shows a simple cell.

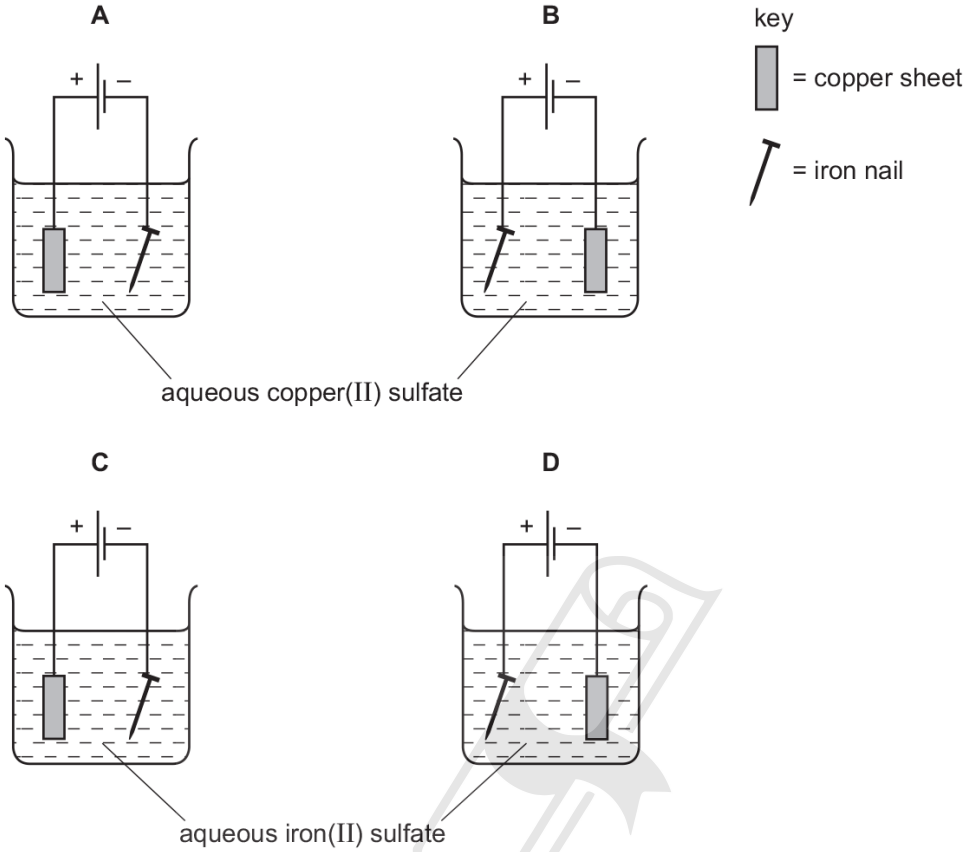


Which pair of metals produces the largest voltage?

	metal P	metal Q
A	iron	copper
B	magnesium	copper
C	magnesium	zinc
D	zinc	copper

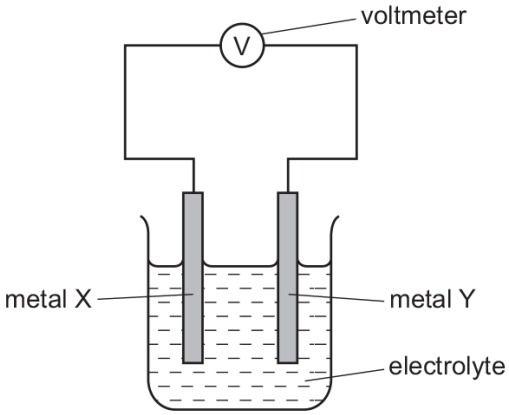
65. 0620_w16_qp_21 Q: 10

Which apparatus could be used to electroplate an iron nail with copper?



66. 0620_w16_qp_21 Q: 11

The diagram shows a simple cell.



Which two metals produce the highest reading on the voltmeter?

	X	Y
A	magnesium	copper
B	magnesium	iron
C	zinc	copper
D	zinc	iron

---

67. 0620_w16_qp_22 Q: 11

A student sets up a number of simple cells by putting strips of two different metals into dilute sulfuric acid.

Which cell produces the highest voltage?

A copper and magnesium

B copper and zinc

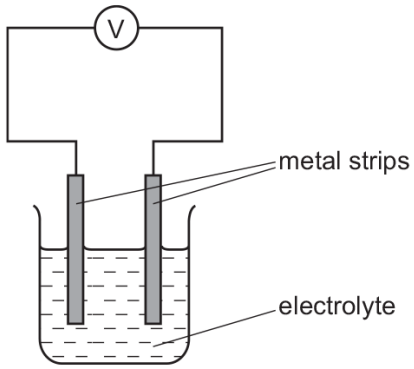
C iron and copper

D magnesium and zinc

---

68. 0620_w16_qp_23 Q: 11

The diagram shows two different metal strips dipped into an electrolyte.



Which pair of metals produces the highest voltage?

A copper and iron

B copper and magnesium

C copper and zinc

D magnesium and iron

SN	Paper	Q. No.	Answer
01	0620_m21_qp_22	9	D
02	0620_m21_qp_22	11	A
03	0620_m21_qp_22	12	C
04	0620_s21_qp_21	10	A
05	0620_s21_qp_21	11	A
06	0620_s21_qp_22	10	A
07	0620_s21_qp_22	11	D
08	0620_s21_qp_23	10	A
09	0620_s21_qp_23	13	C
10	0620_w21_qp_21	10	C
11	0620_w21_qp_22	10	D
12	0620_w21_qp_22	13	C
13	0620_w21_qp_23	10	B
14	0620_m20_qp_22	10	C
15	0620_m20_qp_22	11	D
16	0620_p20_qp_20	13	B
17	0620_p20_qp_20	14	A
18	0620_p20_qp_20	15	A
19	0620_s20_qp_21	10	A
20	0620_s20_qp_21	11	A
21	0620_s20_qp_22	10	A
22	0620_s20_qp_23	10	D
23	0620_w20_qp_21	14	D
24	0620_w20_qp_22	12	C
25	0620_w20_qp_22	29	D
26	0620_w20_qp_23	13	A
27	0620_m19_qp_22	10	C
28	0620_m19_qp_22	11	A
29	0620_s19_qp_21	9	A
30	0620_s19_qp_21	10	D
31	0620_s19_qp_22	9	B
32	0620_s19_qp_22	10	C
33	0620_s19_qp_23	9	A
34	0620_s19_qp_23	10	D
35	0620_w19_qp_21	11	C
36	0620_w19_qp_21	12	B
37	0620_w19_qp_22	11	B
38	0620_w19_qp_23	11	B
39	0620_m18_qp_22	9	C
40	0620_m18_qp_22	10	B
41	0620_s18_qp_21	10	D
42	0620_s18_qp_21	11	C
43	0620_s18_qp_22	10	D
44	0620_w18_qp_21	10	C
45	0620_w18_qp_22	10	B
46	0620_w18_qp_22	11	C
4 7	0620_w18_qp_23	10	C
48	0620_m17_qp_22	10	D
49	0620_m17_qp_22	11	B

SN	Paper	Q. No.	Answer
50	0620_s17_qp_21	9	B
51	0620_s17_qp_21	10	B
52	0620_w17_qp_21	9	A
53	0620_w17_qp_21	10	D
54	0620_m16_qp_22	10	B
55	0620_m16_qp_22	11	B
56	0620_p16_qp_20	13	B
57	0620_p16_qp_20	14	A
58	0620_p16_qp_20	15	A
59	0620_s16_qp_21	10	A
60	0620_s16_qp_21	12	C
61	0620_s16_qp_22	10	A
62	0620_s16_qp_22	12	D
63	0620_s16_qp_23	10	A
64	0620_s16_qp_23	12	B
65	0620_w16_qp_21	10	A
66	0620_w16_qp_21	11	A
67	0620_w16_qp_22	11	A
68	0620_w16_qp_23	11	B