1 What is the function of a relay?

A to allow a current in one circuit to operate a switch in another circuit

B to prevent an electric shock by earthing a metal case

C to protect a circuit by melting if the current becomes too large

D to transform a d.c. voltage to a different value

2 A domestic circuit includes a 30 A fuse. This protects the wiring if there is too much current in the circuit.

In which wire is the 30 A fuse positioned, and what does it do when it operates?

	position	operation
A	live wire	disconnects the circuit
B	live wire	reduces the current to 30 A
C	neutral wire	disconnects the circuit
D	neutral wire	reduces the current to 30 A

3 After some building work in a house, a bare (uninsulated) live wire is left protruding from a wall.

What is the greatest hazard?

A a fire

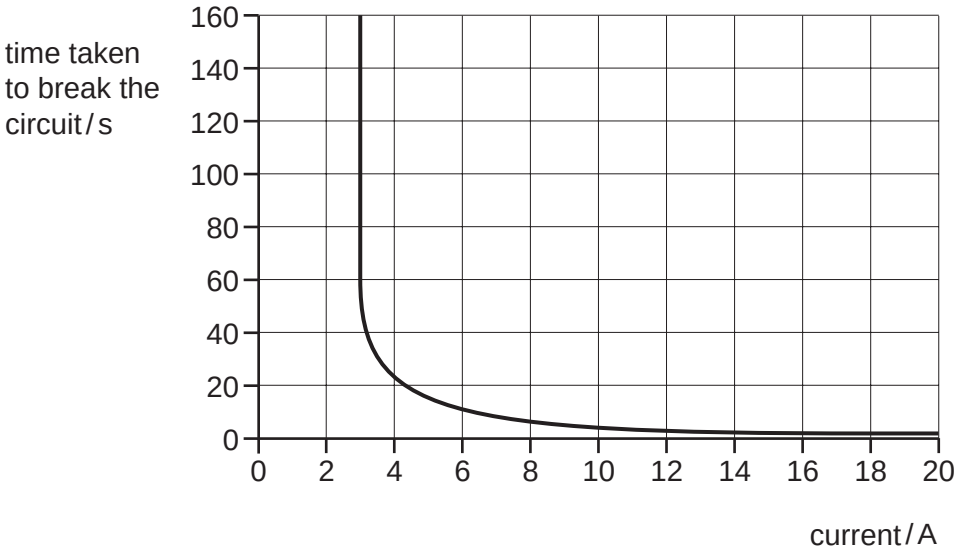
B a fuse blows

C an electric shock

D no current flows

4 A circuit-breaker is designed to protect a circuit which usually carries a current of 2 A.

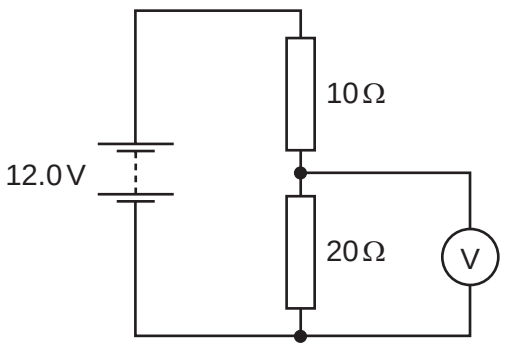
The time taken to break the circuit depends on the current, as shown in the graph.



What happens when the current in the circuit is 2 A and what happens when the current is 18 A?

	when the current is 2 A	when the current is 18 A
A	the circuit breaks in less than 5 seconds	the circuit breaks in less than 5 seconds
B	the circuit breaks in less than 5 seconds	the circuit does not break
C	the circuit does not break	the circuit breaks in less than 5 seconds
D	the circuit does not break	the circuit does not break

5 The diagram shows a 10 Ω resistor and a 20 Ω resistor connected in a potential divider circuit.

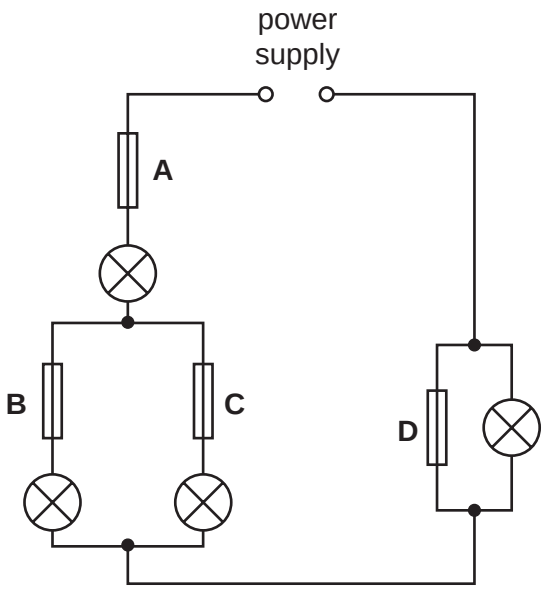


What is the reading on the voltmeter?

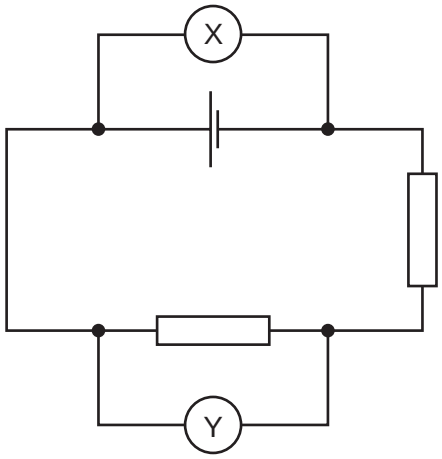
A 4.0 V **B** 6.0 V **C** 8.0 V **D** 12.0 V

6 In the circuit shown, only one of the fuses has blown, but none of the lamps is lit.

Which fuse has blown?



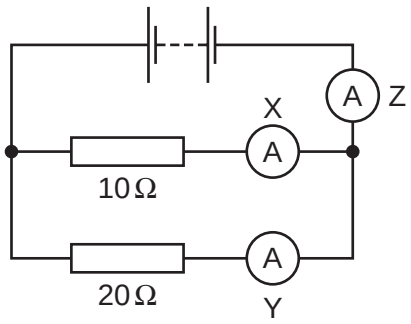
1 The circuit shown includes two meters X and Y, connected correctly.



Which row gives the unit of the quantity measured by X and the unit of the quantity measured by Y?

	meter X	meter Y
A	ampere	ampere
B	ampere	volt
C	volt	ampere
D	volt	volt

2 The circuit shown contains three ammeters X, Y and Z.



Which ammeter has the largest reading?

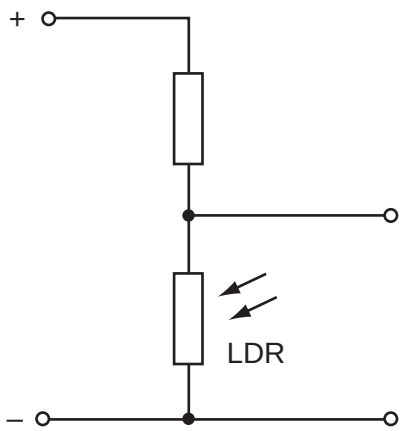
A X

B Y

C Z

D They all have the same reading.

3 The diagram shows part of a circuit used to switch street lamps on and off automatically.



In the evening it gets dark.

Which row shows the effect on the resistance of the light-dependent resistor (LDR) and on the potential difference (p.d.) across it?

	resistance of LDR	p.d. across LDR
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

4 Two meters are connected in a circuit to measure the current in a component and the potential difference across the component.

Which meters are used and how are they connected to the component?

A an ammeter in parallel for current, a voltmeter in series for potential difference

B an ammeter in series for current, a voltmeter in parallel for potential difference

C a voltmeter in parallel for current, an ammeter in series for potential difference

D a voltmeter in series for current, an ammeter in parallel for potential difference

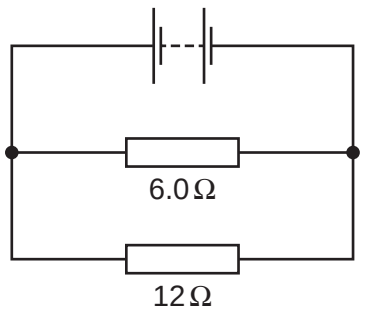
5 P and Q are the circuit symbols for two electrical components.

P Q

Which components are represented by P and by Q?

	P	Q
A	thermistor	fuse
B	thermistor	relay
C	variable resistor	fuse
D	variable resistor	relay

6 The diagram shows two resistors connected in a circuit.



What could be the combined resistance of this arrangement of resistors?

A 4.0 Ω **B** 6.0 Ω **C** 9.0 Ω **D** 18 Ω

7 Why are lamps in a house lighting circuit connected in parallel rather than in series?

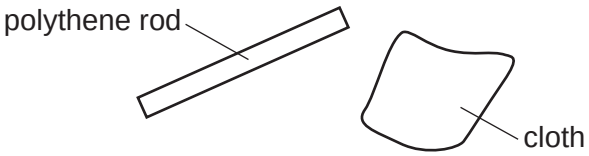
A If one lamp stops working, the remaining lamps become brighter.

B Less current is taken from the power supply.

C The lamps can be turned off independently using switches.

D When more lamps are added, their brightness decreases.

1 A polythene rod is rubbed with a cloth.

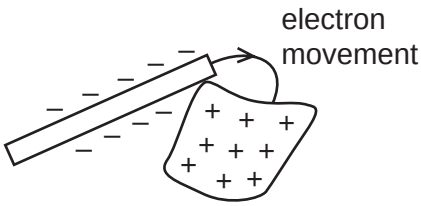


The rod and the cloth both become charged as electrons move between them.

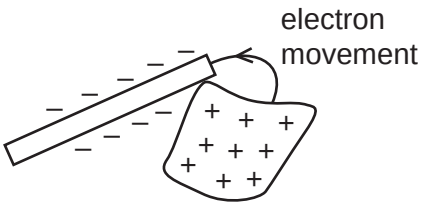
The rod becomes negatively charged.

Which diagram shows how the rod becomes negatively charged, and the final charge on the cloth?

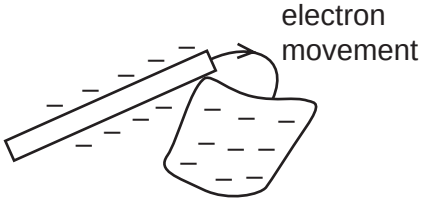
A



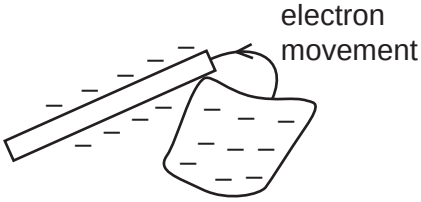
B



C



D



2 A wire has a certain electrical resistance.

The diameter and length of the wire may be changed.

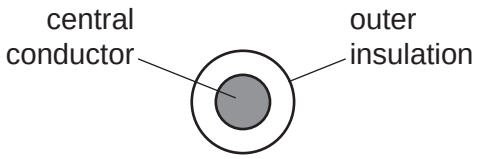
Which pair of changes **must** cause the resistance of the wire to increase?

	change of diameter	change of length
A	decrease	decrease
B	decrease	increase
C	increase	decrease
D	increase	increase

3 Which row describes the nature and a property of all β-particles?

	nature	property
A	electrons	can travel through a vacuum
B	electrons	stopped by a thin sheet of paper
C	helium nuclei	can travel through a vacuum
D	helium nuclei	stopped by a thin sheet of paper

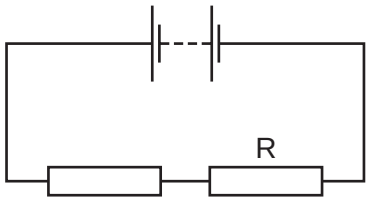
4 A flexible electrical cable consists of a central conductor and outer insulation.



Which pair of materials is suitable for the cable?

	central conductor	outer insulation
A	copper	plastic
B	lead	wood
C	plastic	copper
D	wood	lead

5 The diagram shows a battery connected to two resistors.



Four students separately measure the electromotive force (e.m.f.) of the battery, the current in the resistors, and the potential difference (p.d.) across resistor R.

Their results are shown in the table below.

Which row shows values with their correct units?

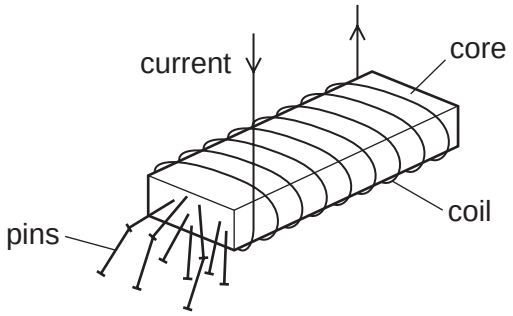
	e.m.f.	current	p.d.
A	3.0 A	0.30 V	1.5 A
B	3.0 A	0.30 A	1.5 V
C	3.0 V	0.30 V	1.5 A
D	3.0 V	0.30 A	1.5 V

5 The table describes four different resistance wires. They are all made from the same metal.

Which wire has the smallest resistance?

	length of wire / m	diameter of wire / mm
A	2.0	1.0
B	2.0	1.5
C	3.0	1.0
D	3.0	1.5

1 A strong electromagnet is used to attract pins.



What happens when the current in the coil is halved?

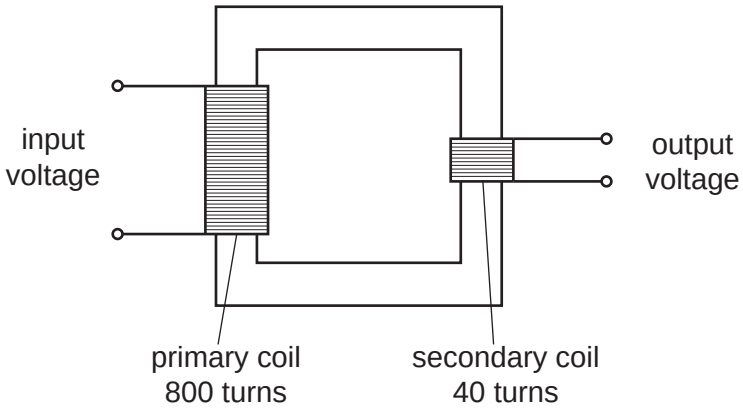
A No pins are attracted.

B Some pins are attracted, but not as many.

C The same number of pins is attracted.

D More pins are attracted.

2 The diagram shows a transformer.



The input voltage is 240 V.

What is the output voltage?

A 6.0 V **B** 12 V **C** 20 V **D** 40 V

3 A coil carries a current in a magnetic field. The coil experiences a turning effect.

Which device uses this effect?

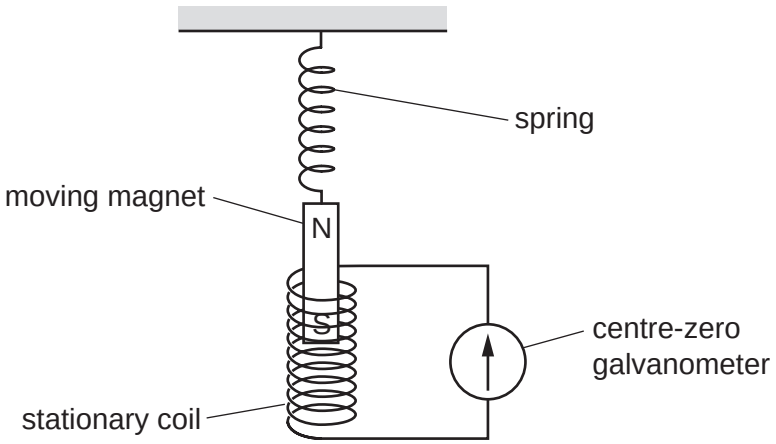
A a d.c. motor

B an electromagnet

C a relay

D a transformer

4 A magnet is suspended from a spring so that it can move freely inside a stationary coil. The coil is connected to a sensitive centre-zero galvanometer.



The magnet repeatedly moves slowly up and down.

What does the galvanometer show?

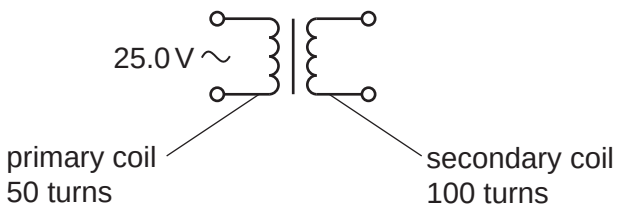
A a constantly changing reading

B a steady reading to the left

C a steady reading to the right

D a steady reading of zero

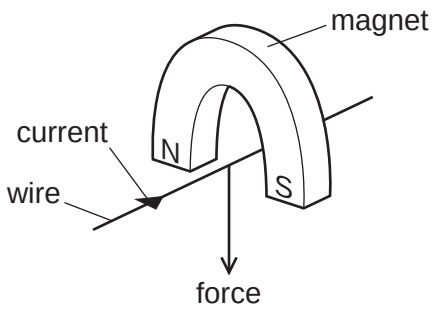
5 A transformer has 50 turns on its primary coil and 100 turns on its secondary coil. An alternating voltage of 25.0 V is connected across the primary coil.



What is the voltage across the secondary coil?

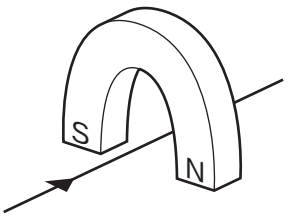
A 12.5 V **B** 50.0 V **C** 100 V **D** 200 V

6 A wire is placed between the poles of a horseshoe magnet. There is a current in the wire in the direction shown, and this causes a force to act on the wire.



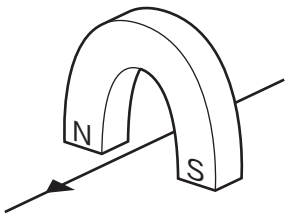
Three other arrangements, P, Q and R, of the wire and magnet are set up as shown.

P



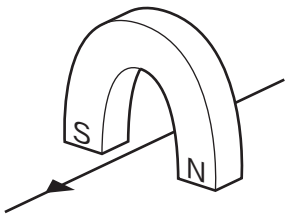
magnet turned around

Q



current direction reversed

R



current direction reversed and magnet turned around

Which arrangement or arrangements will cause a force in the same direction as the original arrangement?

A P, Q and R **B** P and Q only **C** P only **D** R only

1 Which statement about a magnet is correct?

A A magnet attracts a gold rod.

B A magnet does not attract a plastic rod.

C A magnet never repels another magnet.

D A magnet sometimes repels an unmagnetised nickel rod.

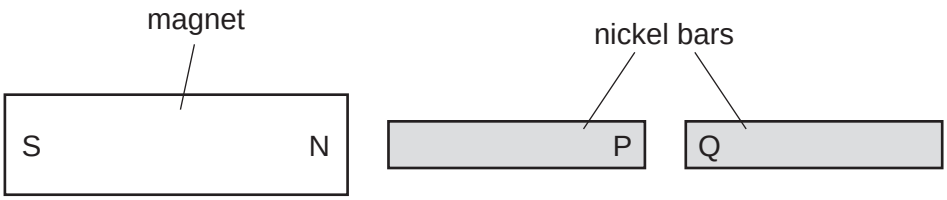
2 A student wishes to make a permanent magnet. She has an iron rod and a steel rod.

Which rod should she use to make the permanent magnet, and is this rod a hard magnetic material or a soft magnetic material?

	rod	type of magnetic material
A	iron	hard
B	iron	soft
C	steel	hard
D	steel	soft

3 Two nickel bars are placed close to the N-pole of a bar magnet.

The nickel bars become magnetised.



Which row states the pole induced at P, the pole induced at Q, and the type of magnetic force between P and Q?

	pole induced at P	pole induced at Q	force between P and Q
A	N	S	attraction
B	N	S	repulsion
C	S	N	attraction
D	S	N	repulsion

4 A student wishes to make a permanent magnet. She has an iron rod and a steel rod.

Which rod should she use to make the permanent magnet, and is this rod a hard magnetic material or a soft magnetic material?

	rod	type of magnetic material
A	iron	hard
B	iron	soft
C	steel	hard
D	steel	soft

5 Which statement about magnetism is correct?

A An unmagnetised iron bar becomes magnetised when it is placed near a magnet.

B An unmagnetised steel bar can be magnetised by passing a current through it.

C The direction of magnetic field lines is from an S-pole to an N-pole.

D The N-poles of two magnets attract each other.

6 In which pair are both materials magnetic?

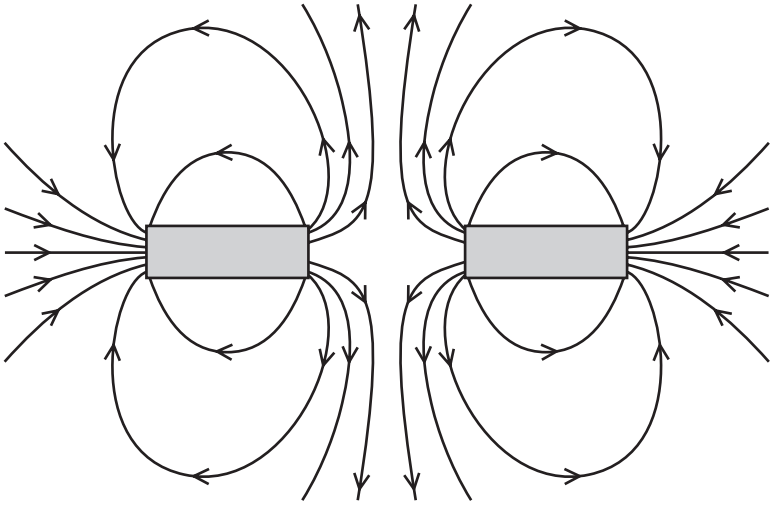
A aluminium and copper

B copper and iron

C iron and steel

D steel and aluminium

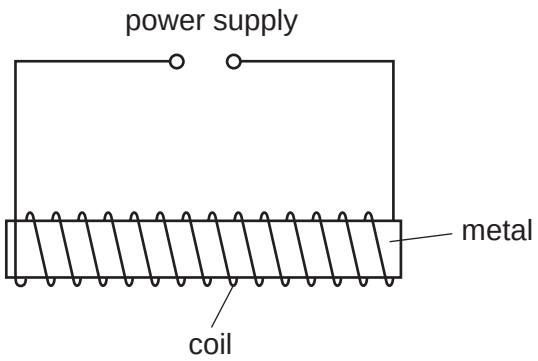
7 The diagram shows the magnetic field around two bar magnets.



Which diagram shows the poles of the magnets?

A	N S	N S
B	N S	S N
C	S N	N S
D	S N	S N

8 The diagram shows apparatus that can be used to make a magnet.



Which metal and which power supply are used to make a **permanent** magnet?

	metal	p supply
A	iron	6 V a.c.
B	iron	6 V d.c.
C	steel	6 V a.c.
D	steel	6 V d.c.