



KS3 Science

Electricity

Question Paper

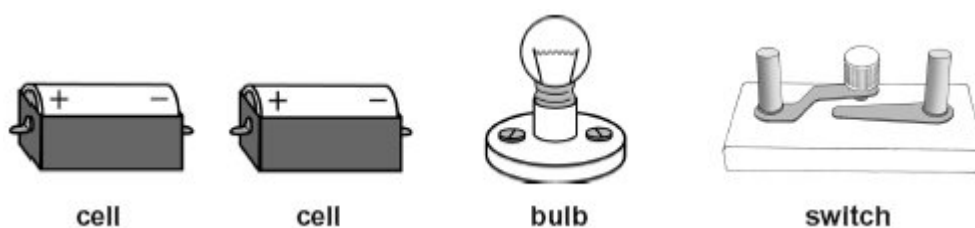
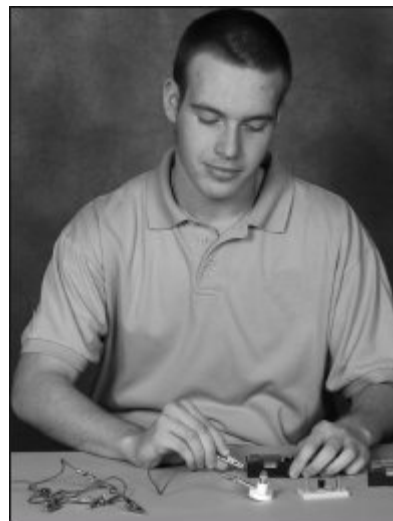
Time available: 41 minutes

Marks available: 57 marks

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1.

Ben makes a series circuit using two identical cells, a bulb and a switch to turn the bulb on and off.



(a) Draw a circuit diagram of Ben's circuit. Use the correct symbols.

The cells have been drawn for you.



3 marks

(b) Which part of the circuit supplies the energy?

.....

1 mark

(c) Ben adds another identical bulb to the circuit in series.

How does the **brightness** of the first bulb change?

.....

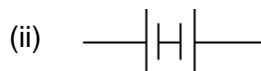
1 mark

(d) How will the **brightness** of the bulbs change when the cells shown below are placed into Ben's circuit?



.....

1 mark



.....

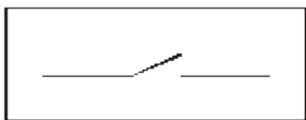
1 mark
maximum 7 marks

2.

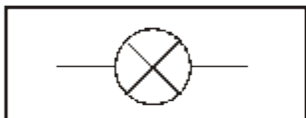
(a) Draw a line from each circuit symbol below to the correct name.
Draw only four lines.

circuit symbol

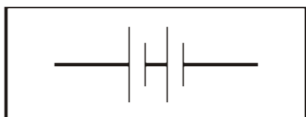
name



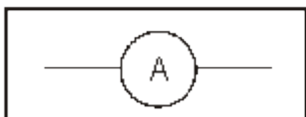
ammeter



switch



motor

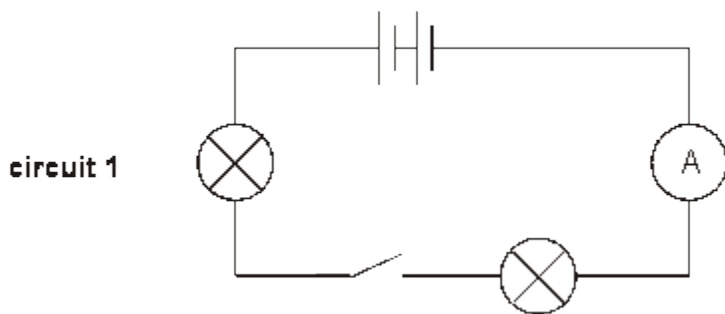


battery

bulb

3 marks

(b) Fred made **circuit 1** as shown below.

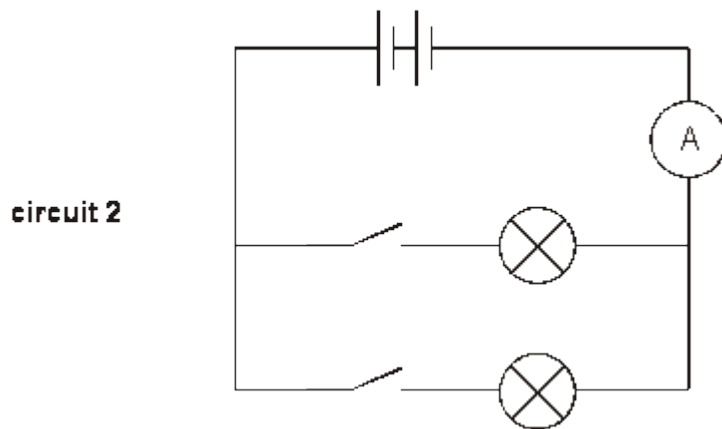


Give the name of the part that is the energy source for the circuit.

.....

1 mark

(c) Fred then made **circuit 2** as shown below.



In the table below, tick a box to show whether **circuit 1** and **circuit 2** are series or parallel circuits.

Tick only **two** boxes.

	series	parallel
circuit 1	<input type="checkbox"/>	<input type="checkbox"/>
circuit 2	<input type="checkbox"/>	<input type="checkbox"/>

1 mark

(d) What metal is usually used for wires in electric circuits?

.....

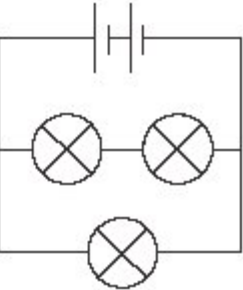
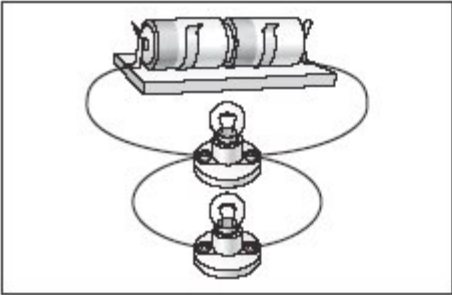
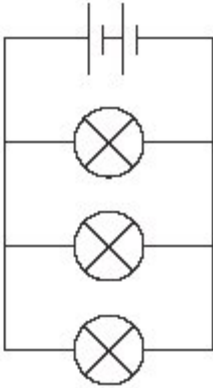
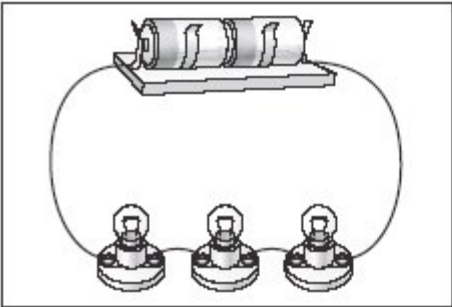
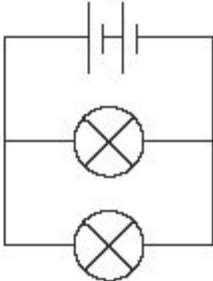
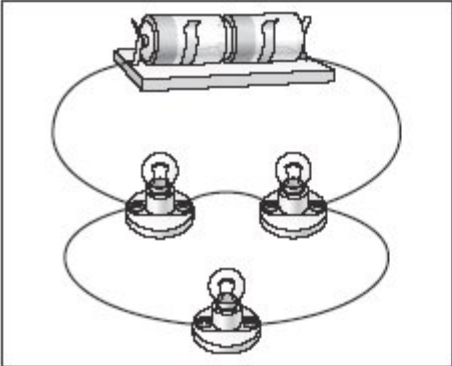
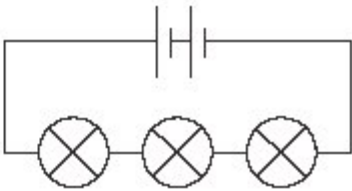
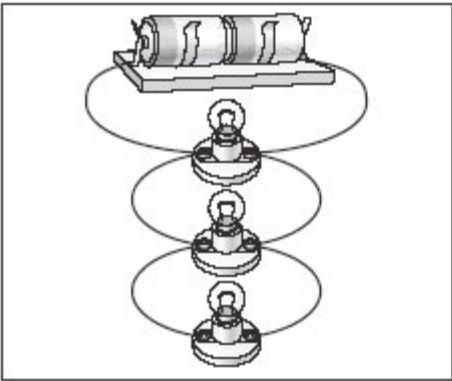
1 mark
maximum 6 marks

3.

(a) Draw a line from each electrical circuit to the correct circuit diagram.
Draw only **four** lines.

electrical circuit

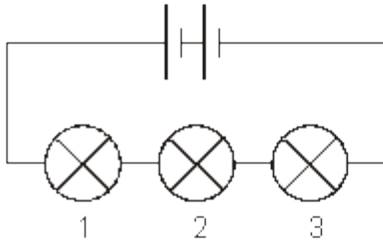
circuit diagram



2 marks

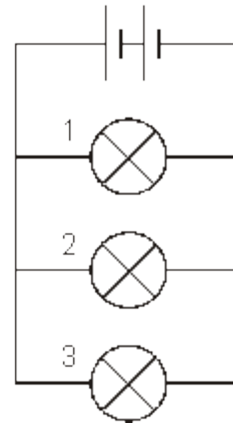
(b) In each circuit below, **bulb 1 breaks** and goes off.

Under each circuit diagram below, tick the correct boxes to show if bulb 2 and bulb 3 are **on** or **off**.



circuit A

	on	off
bulb 1 breaks		?
bulb 2		
bulb 3		



circuit B

	on	off
bulb 1 breaks		?
bulb 2		
bulb 3		

2 marks

(c) Give the name of the part that provides energy for each circuit.

.....

1 mark

(d) Why is copper used for wires in a circuit?

Tick the correct box.

Copper does **not** stick to a magnet.

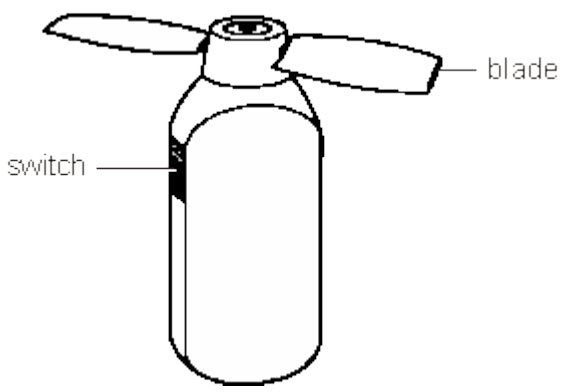
Copper is a good conductor of electricity.

Copper is a brown metal.

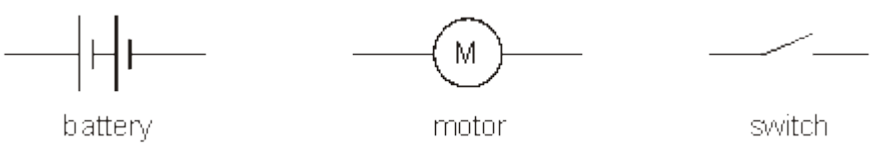
Copper is a good conductor of heat.

1 mark
maximum 6 marks

4. Susan has a small fan to keep herself cool.
When she switches it on, a motor turns the blades to blow air.



(a) The diagrams below show the symbols for a battery, a motor and a switch.



In the space below, draw a series circuit diagram for the fan using these symbols.

1 mark

(b) (i) Which part provides energy for the circuit?

.....

1 mark

(ii) Some of this energy is used to turn the blades.
The rest of the energy is wasted.

Complete the sentence below. Choose words from the list.

chemical **heat** **light** **sound**

1 mark

When the blades are turning, energy is wasted as

..... energy and energy.

1 mark

(c) Susan built a circuit using a battery, a motor and a switch.
She closed the switch to turn the motor on.

(i) Susan added a bulb to the circuit.
The current in the circuit **decreased**.

How did this affect the motor?

.....

1 mark

(ii) Susan removed the motor from the circuit.
The current in the circuit **increased**.

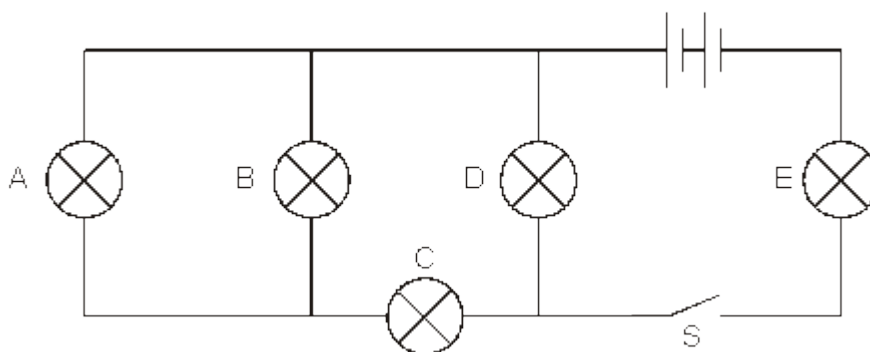
How did this affect the bulb?

.....

1 mark

maximum 6 marks

5. (a) Max built **circuit 1** as shown below.



circuit 1

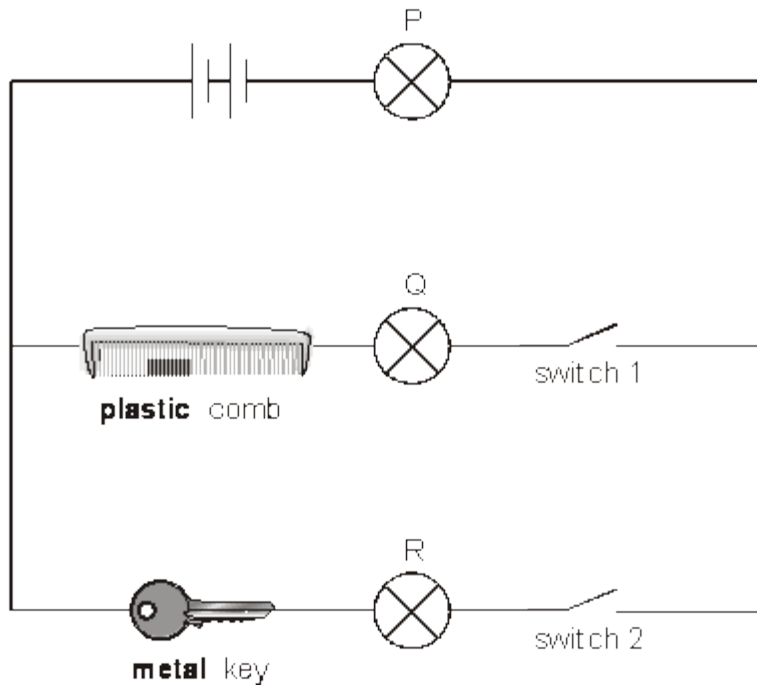
He closed the switch, S, and all the bulbs came on.
 One of the bulbs then broke and **all** the bulbs went off.

Which bulb must have broken?
 Give the letter.

.....

1 mark

- (b) Max built **circuit 2** as shown below.
 He connected a plastic comb and a metal key in different parts of the circuit.



circuit 2

Look carefully at **circuit 2**.

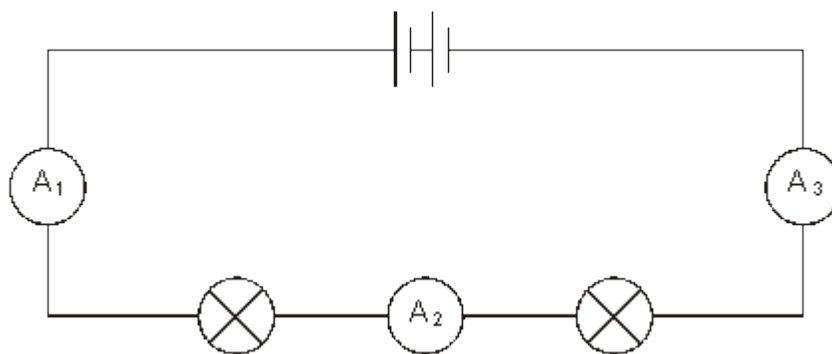
Complete the table below to show which bulbs in circuit 2 will be on or off when different switches are open or closed.

Write **on** or **off** in the boxes below.

switch 1	switch 2	bulb P	bulb Q	bulb R
open	open	off	off	off
open	closed			
closed	open			

2 marks

(c) Max built **circuit 3** using a battery, two bulbs and three ammeters.



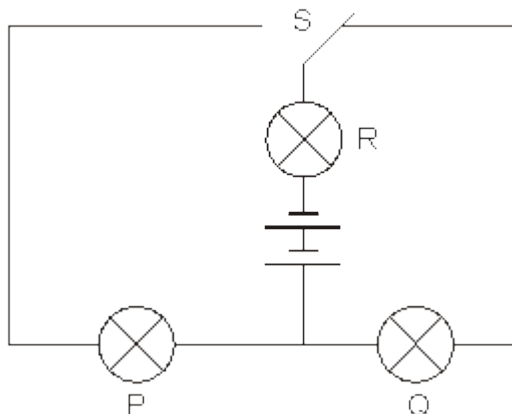
circuit 3

The current reading on ammeter A_1 was 0.8 amps.
 What would be the reading on ammeters A_2 and A_3 ?
 Place **one** tick in the table by the correct pair of readings.

reading on ammeter A_2 (amps)	reading on ammeter A_3 (amps)	correct pair of readings
0.8	0.8	
0.8	0.4	
0.4	0.8	
0.4	0.4	

1 mark
 maximum 4 marks

- 6.** (a) The diagram below shows a circuit with a two-way switch, S.
Rosie puts the switch in the position shown below.



Complete the table below to show if the bulbs are on **or** off.
Write **on** or **off** for each bulb.

bulb	on or off
P	
Q	
R	

1 mark

- (b) Give the name of the part that provides energy for the circuit.

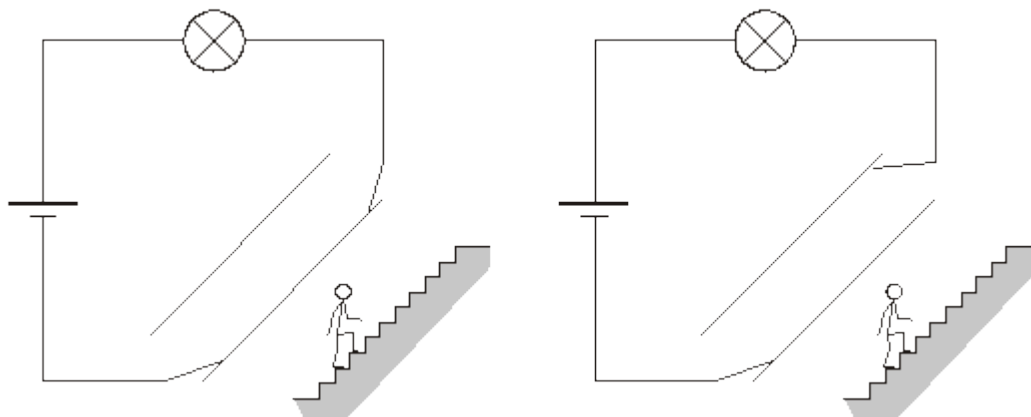
.....

1 mark

- (c) The diagrams below show a light-bulb over a staircase of a model house.

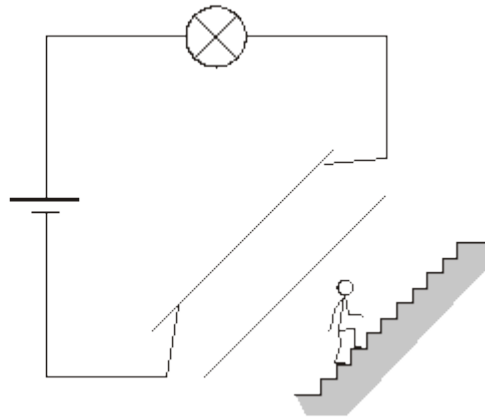
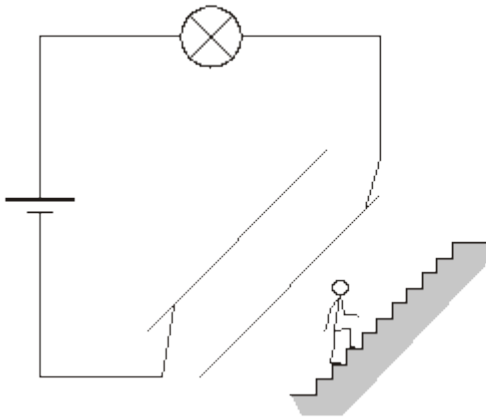
There is a two-way switch at the bottom of the stairs and another two-way switch at the top.

Under each diagram, tick **one** box to show if the bulb is **on** or **off**. The first one has been done for you.



on	<input checked="" type="checkbox"/>
off	<input type="checkbox"/>

on	<input type="checkbox"/>
off	<input type="checkbox"/>



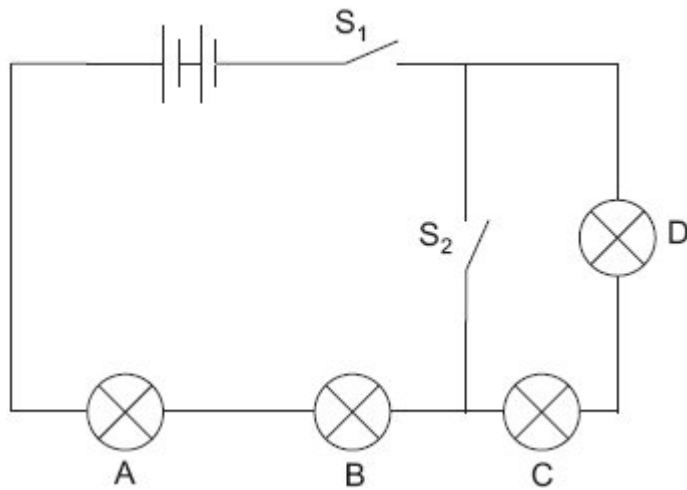
on	<input type="checkbox"/>
off	<input type="checkbox"/>

on	<input type="checkbox"/>
off	<input type="checkbox"/>

2 marks
maximum 4 marks

7.

Lorna built the circuit drawn below. All the bulbs are identical.

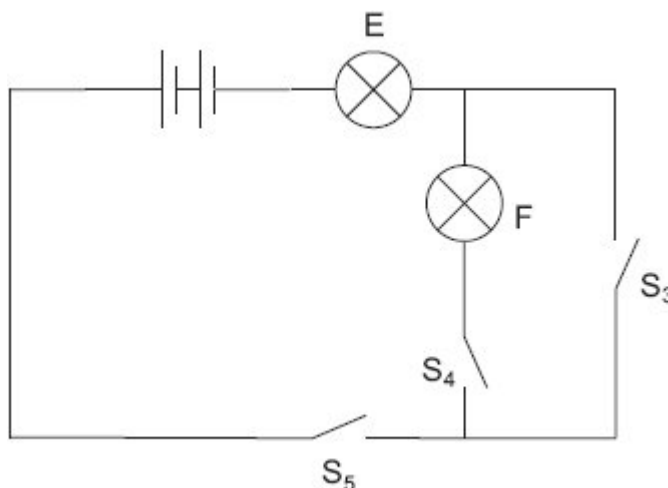


(a) Complete the table below by writing **on** or **off** for each bulb.

switch		bulb			
S ₁	S ₂			A	B
open	open			off	off
open	closed				
closed	open				
closed	closed				

3 marks

(b) Lorna then built a different circuit as shown below.



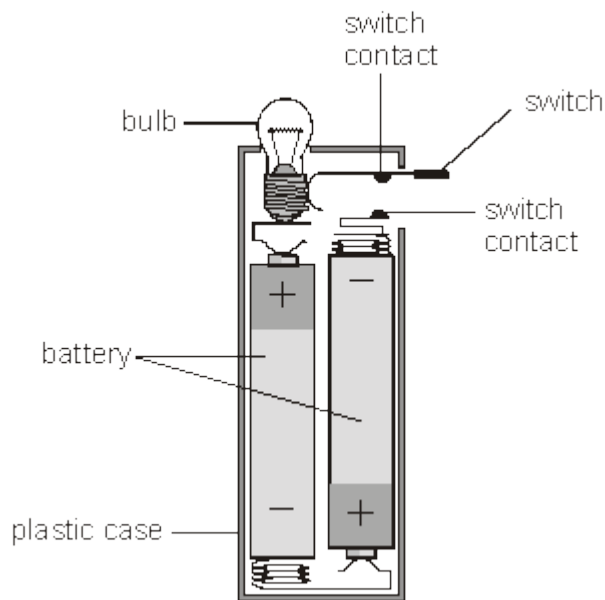
How could Lorna get both bulbs to light at the same time in this circuit?

.....

.....

1 mark
maximum 4 marks

8. (a) The drawing below shows the parts of a torch.



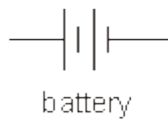
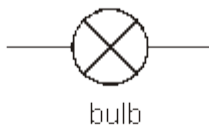
(i) Paul closed the switch.
Why did this turn on the torch?

.....

.....

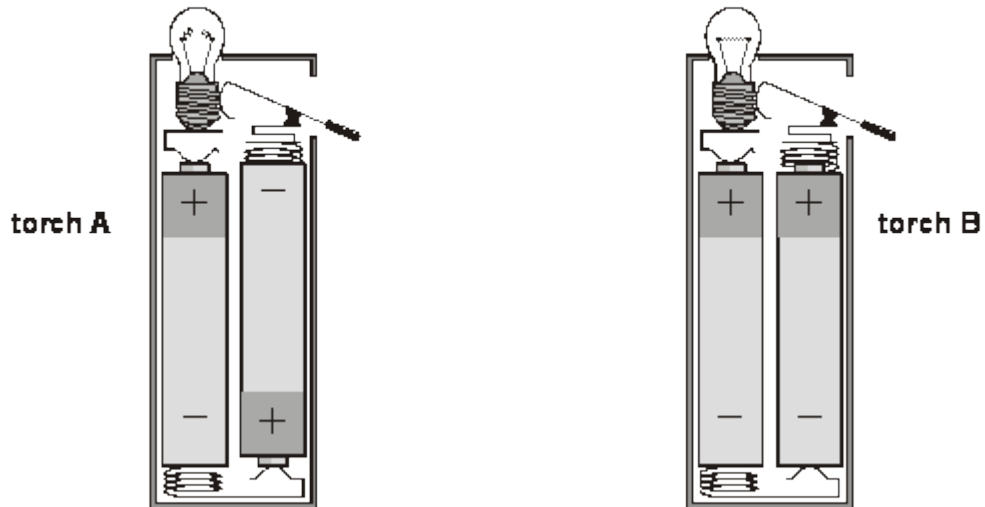
1 mark

(ii) The diagrams below show symbols for a battery, a bulb and a switch.
Connect the symbols to make a series circuit for the torch.



1 mark

- (b) The drawings below show two other torches. In both torches, the bulbs will **not** light even when Paul closes the switches.



Look carefully at the drawings.

- (i) Why is the circuit of torch A **not** complete?

.....

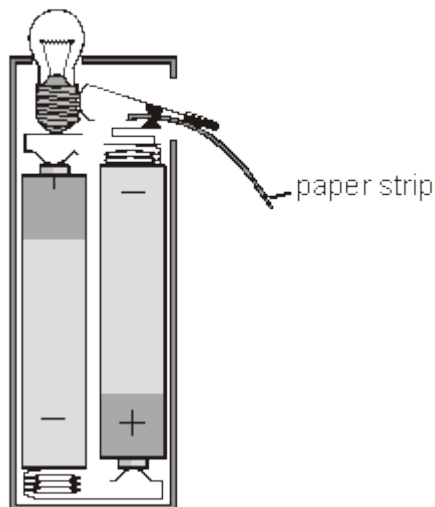
1 mark

- (ii) What could you do to torch B to get the bulb to light?

.....

1 mark

- (c) When Paul bought his torch there was a paper strip between the contacts of the switch as shown below.



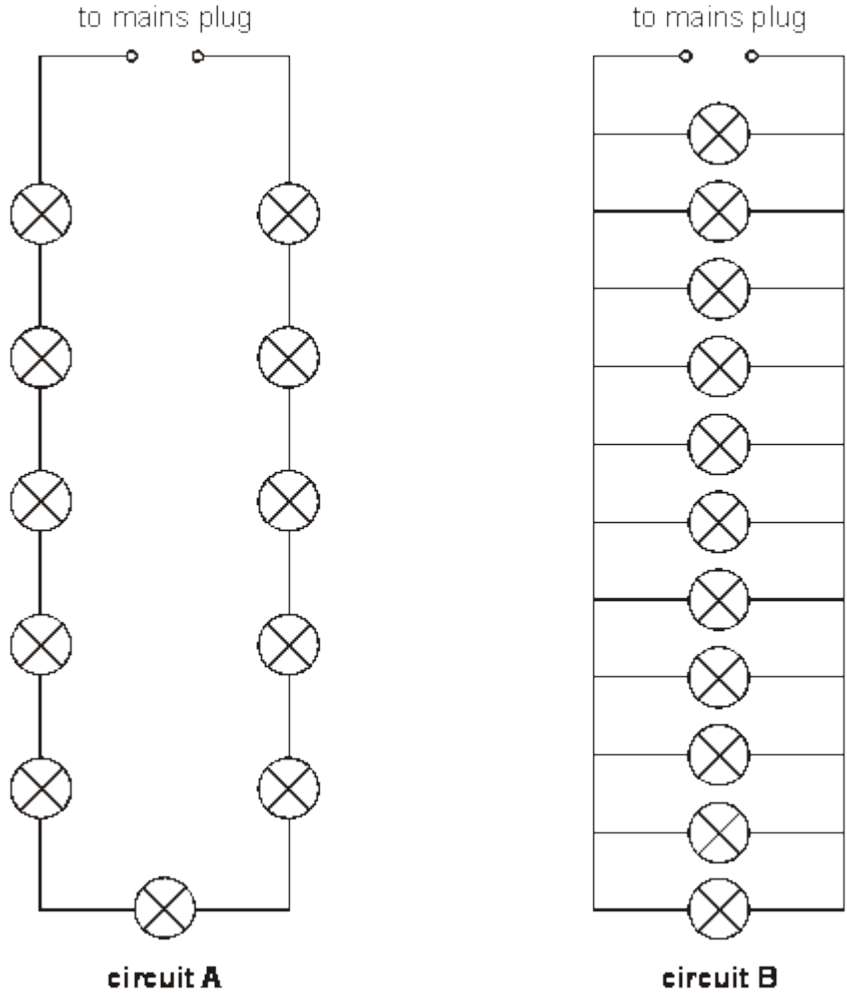
Paul had to remove the paper strip before he could turn the torch on.
Give the reason for this.

.....
.....

1 mark
maximum 5 marks

9.

(a) Ahmed bought two sets of lights to put on a tree in his garden. Circuit diagrams for the two sets of lights are shown below.



Choose words from the list below to fill the gaps in the sentences.

all none some parallel series short

(i) **Circuit A** is a circuit.

If one of the bulbs breaks in **circuit A** of the other bulbs will go out.

1 mark

(ii) **Circuit B** is a circuit.

If one of the bulbs breaks in **circuit B** of the other bulbs will go out.

1 mark

(b) Light rays from the bulbs hit the mirror of Ahmed's car.

What happened to the light rays when they hit the mirror?

.....

1 mark

(c) The tree has root hairs.
What are the functions of root hairs?
Tick the **two** correct boxes.

They absorb water from the soil.

They absorb sunlight.

They produce seeds.

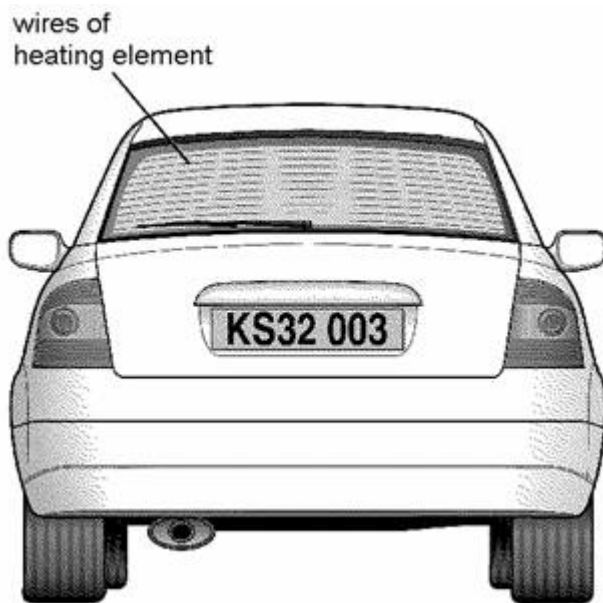
They absorb minerals from the soil.

They attract bees for pollination.

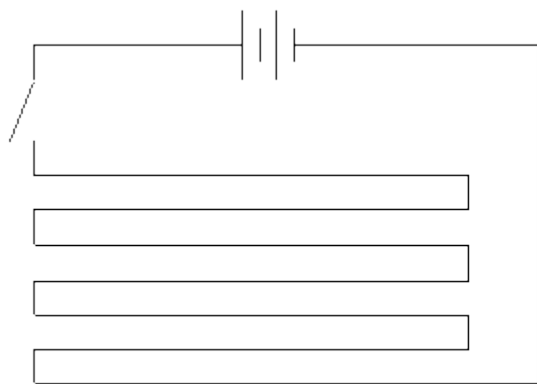
2 marks
maximum 5 marks

10. The back window of this car contains a heating element.

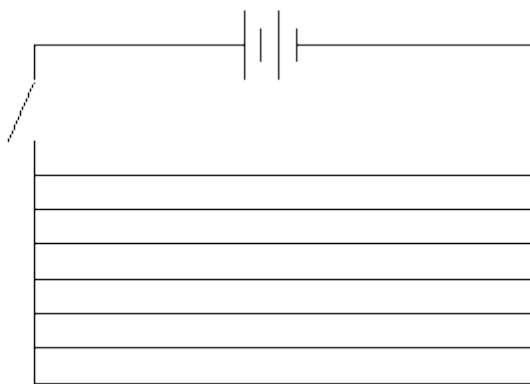
The heating element is part of an electrical circuit connected to the battery of the car.



The diagrams below show **two** ways of connecting the circuit of a heating element.



circuit A



circuit B

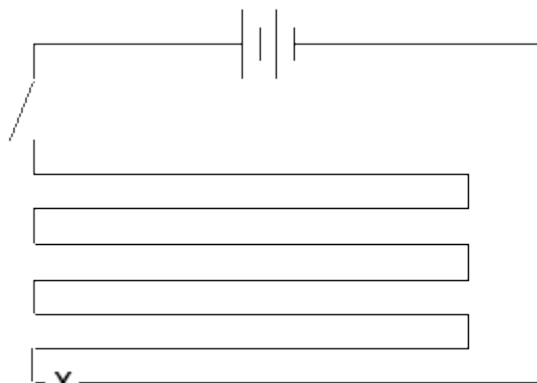
(a) Give the name of each type of circuit:

circuit A

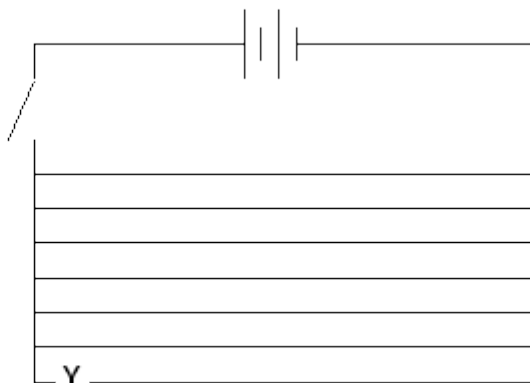
circuit B

1 mark

(b) A wire gets broken at point X on circuit A and at point Y on circuit B.



circuit A



circuit B

When the switch is closed, how does the broken wire affect the heating element in:

(i) circuit A?

.....

1 mark

(ii) circuit B?

.....

1 mark

(c) In very cold weather, ice may form on the back window of the car. When the heating element is switched on, the ice will disappear and the surface of the window will become clear and dry.

(i) Fill the gap below to show the energy transfer that takes place.

When the heater is switched on, energy is transferred from the wires to the ice.

1 mark

(ii) As the window becomes clear and dry, physical changes take place in the ice. Fill the gaps below to show the physical changes which take place.

from to to

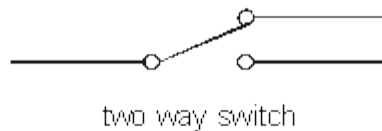
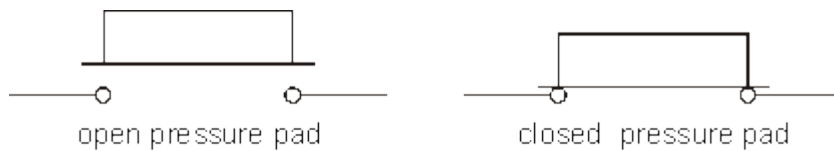
1 mark

Maximum 5 marks

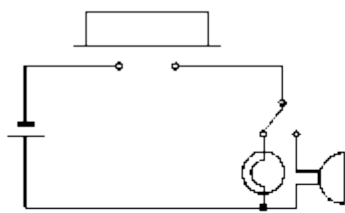
11.

Pressure pads can be used to set off burglar alarms. The alarm is set off when someone steps on the pad. The alarm works by sounding a buzzer **or** switching on a lamp **or** both.

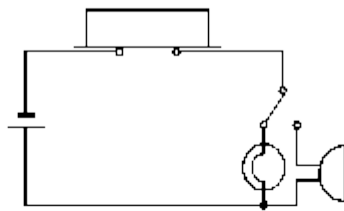
The symbols for a pressure pad, a two way switch, a buzzer and a lamp are shown below.



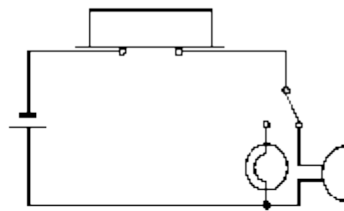
Here are five circuit diagrams.



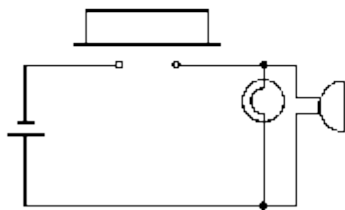
A



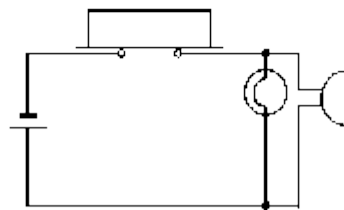
B



C



D



E

Look carefully at the five circuit diagrams.

Tick the correct box to show what is happening in each circuit.

circuit diagram	only the buzzer is on	only the lamp is on	both the buzzer and the lamp are on	neither the buzzer nor the lamp is on
A				
B				
C				
D				
E				

5 marks