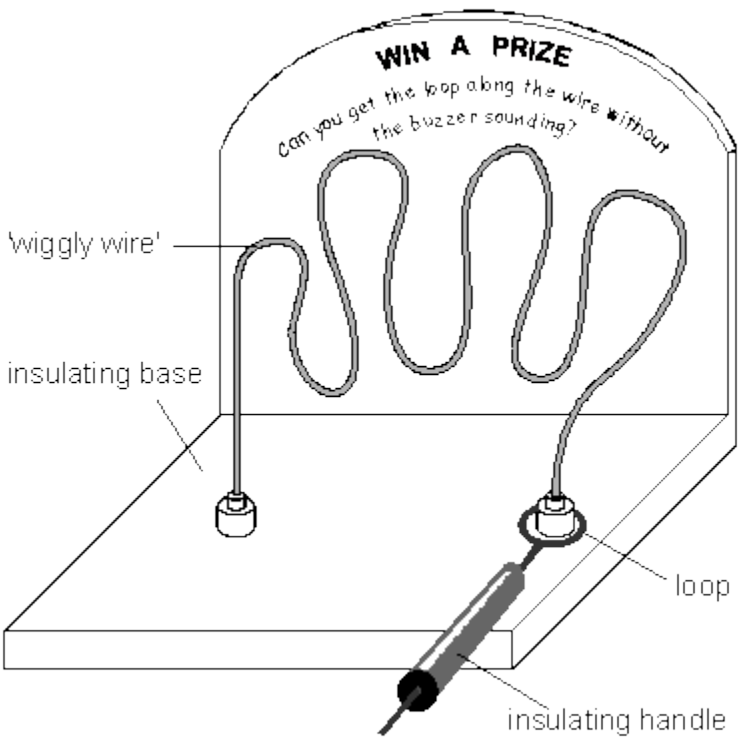


1

Anne makes an electrical 'wiggly wire' game for a fête. To win a prize, the loop must not touch the 'wiggly wire'.



(a) The loop is made of a conducting material. The handle is made of an insulating material.

Give the name of **one** material which could be used to make:

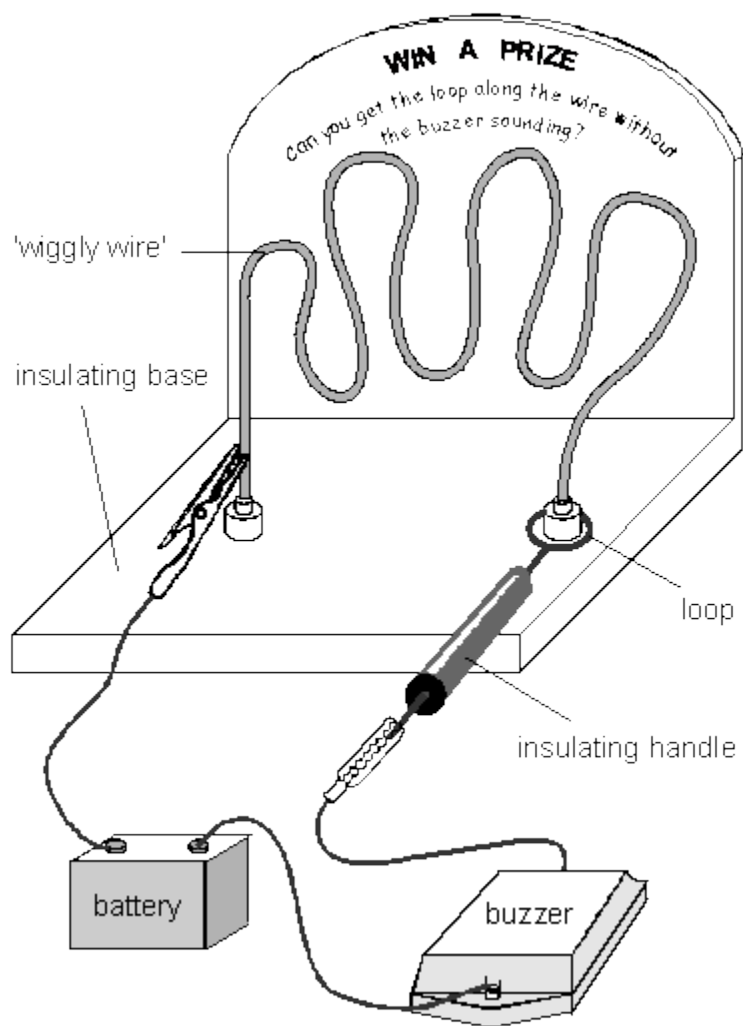
(i) the loop;
.....

1 mark

(ii) the insulation handle.
.....

1 mark

(b) The loop and the 'wiggly wire' are connected to a battery and a buzzer.



The buzzer only makes a noise when the loop touches the 'wiggly wire'. Explain why.

.....
.....

1 mark

(c) Later, Anne paints the 'wiggly wire', but then the game does **not** work. Suggest why the game does **not** work with a painted wire.

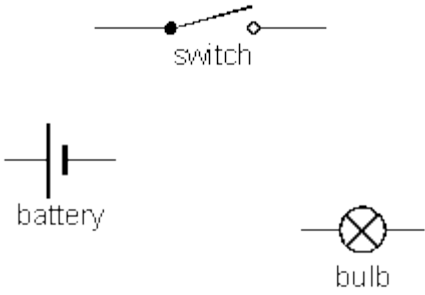
.....
.....

1 mark
Maximum 4 marks

2

Jo uses a battery, a switch and a bulb to make a series circuit.

- (a) The diagrams show symbols for a battery, a bulb and a switch. Connect the symbols to make Jo's circuit.



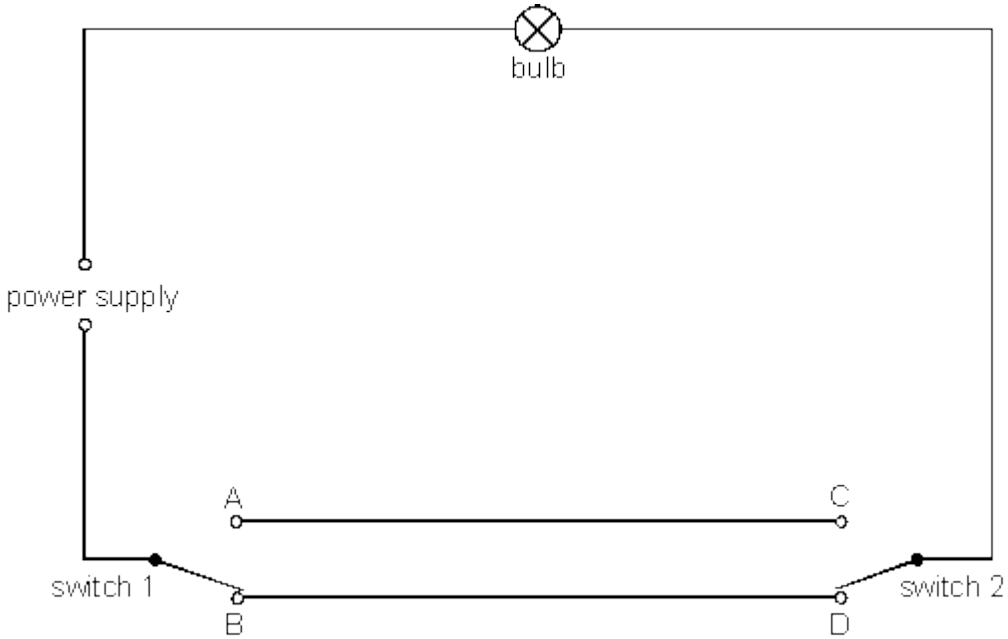
1 mark

- (b) Jo closes the switch and the bulb lights up. Then she connects the battery the other way round. What happens to the bulb when Jo closes the switch again? Tick the correct box.

It is brighter.	<input type="checkbox"/>	It is dimmer.	<input type="checkbox"/>
It is the same brightness.	<input type="checkbox"/>	It does not light up.	<input type="checkbox"/>

1 mark

- (c) A corridor has a switch at each end and one light bulb in the middle. The circuit diagram below shows how they are connected.

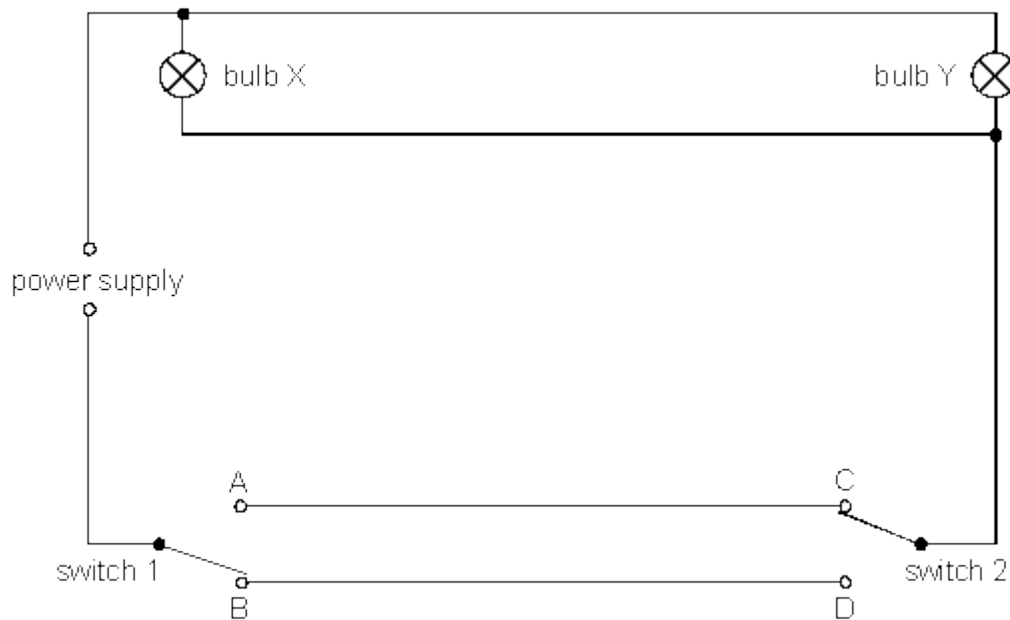


In the diagram above, the switches are shown in positions B and D and the bulb is on. Complete the table below to show whether the light bulb is on or off. Write **on** or **off**.

position of switch 1	position of switch 2	is the bulb on or off?
B	D	on
A	D	
A	C	

1 mark

- (d) The circuit is changed so that there is a bulb at each end of the corridor. They are connected as shown below.



- (i) In the diagram above, the switches are shown in positions B and C. Which bulbs, if any, are on?

.....

1 mark

- (ii) The switches are arranged so that both bulbs are on. Bulb X breaks. What, if anything, happens to bulb Y?

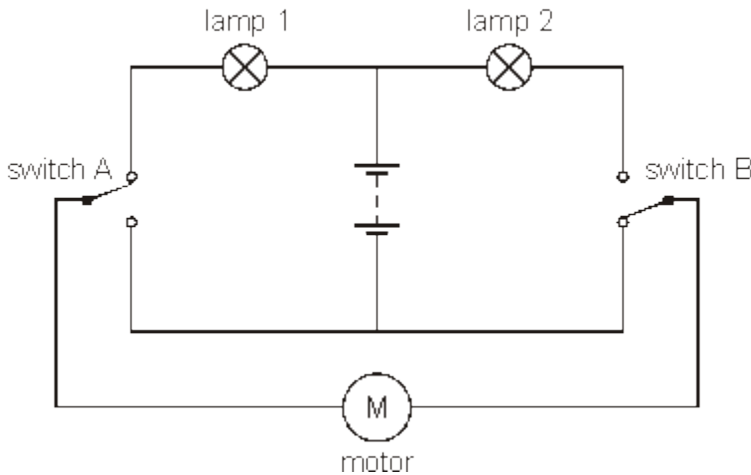
.....

1 mark

Maximum 5 marks

3

The diagram shows a circuit for controlling an electric motor.



This circuit can make the motor turn forwards or backwards.

Complete the table to show which lamp, if any, is lit and in which direction, if any, the motor turns.

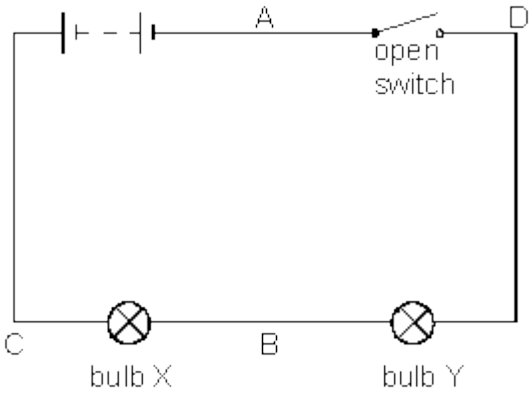
The first row has been done for you.

switch A	switch B	Which lamp, if any, is lit?	In which direction, if any, does the motor turn?
up	down	lamp 1	forwards
up	up		
down	up		
down	down		

4 marks

4

A circuit is shown below.



(a) The switch is **open**. Steven connects point **A** to point **B** with a piece of copper wire.

Which bulbs, if any, light up?

.....

1 mark

(b) Steven removes the copper wire and uses it to connect point **C** to point **D**.

The switch is still **open**.

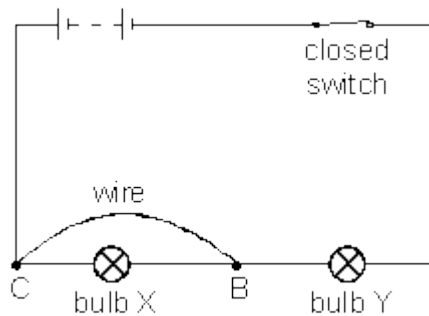
Which bulbs, if any, light up?

.....

1 mark

(c) Steven removes the copper wire and **closes** the switch. Both bulbs light up, but not very brightly.

He then uses the copper wire to connect point **B** to point **C**.



Choose from the following words to answer the questions below.

gets brighter stays the same goes out

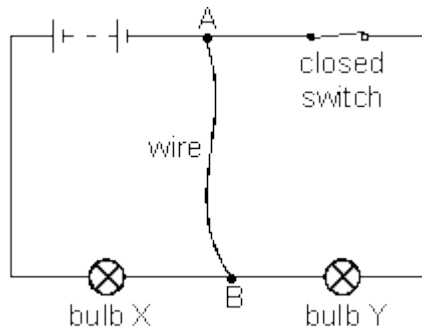
(i) What happens to bulb **X**?

1 mark

(ii) What happens to bulb **Y**?

1 mark

(d) Steven removes the copper wire. The switch is still **closed**. Both bulbs light up, but not very brightly. He then uses the copper wire to connect point **A** to point **B**.



Choose from the following words to answer the questions below.

gets brighter stays the same gets dimmer goes out

(i) What happens to bulb **X**?

1 mark

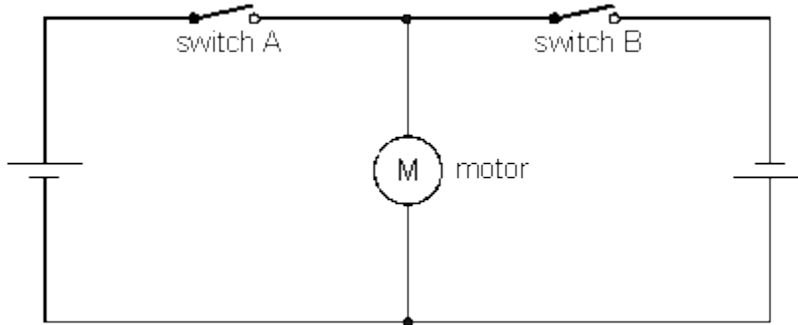
(ii) What happens to bulb **Y**?

1 mark

Maximum 6 marks

5

Gary uses the following circuit to operate the electric motor of his model crane.



Look carefully at the way Gary has connected the two cells.
When he closes switch A the motor runs and the crane lifts a load.

(a) Gary opens switch A and closes switch B.

Describe what happens to the motor.

.....
.....

1 mark

(b) Gary closes both switches, A and B. Describe what happens to the motor.

.....

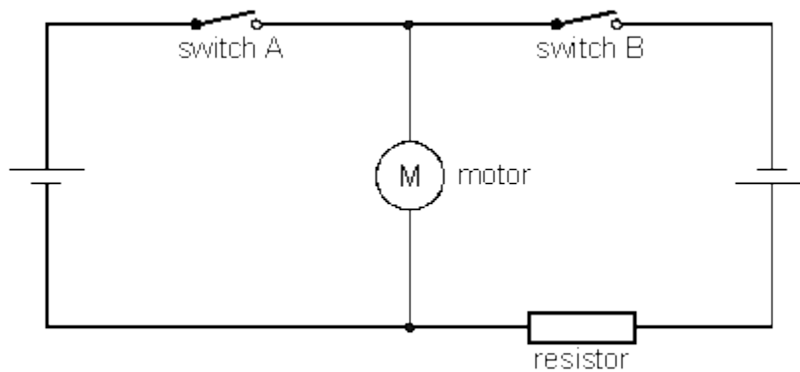
1 mark

(c) Both switches should **not** be closed at the same time. Explain why.

.....
.....

1 mark

(d) Gary puts a resistor into his circuit as shown.



What difference does the resistor make to the motor:

(i) when switch A is closed and switch B is open?

.....
.....

1 mark

(ii) when switch A is open and switch B is closed?

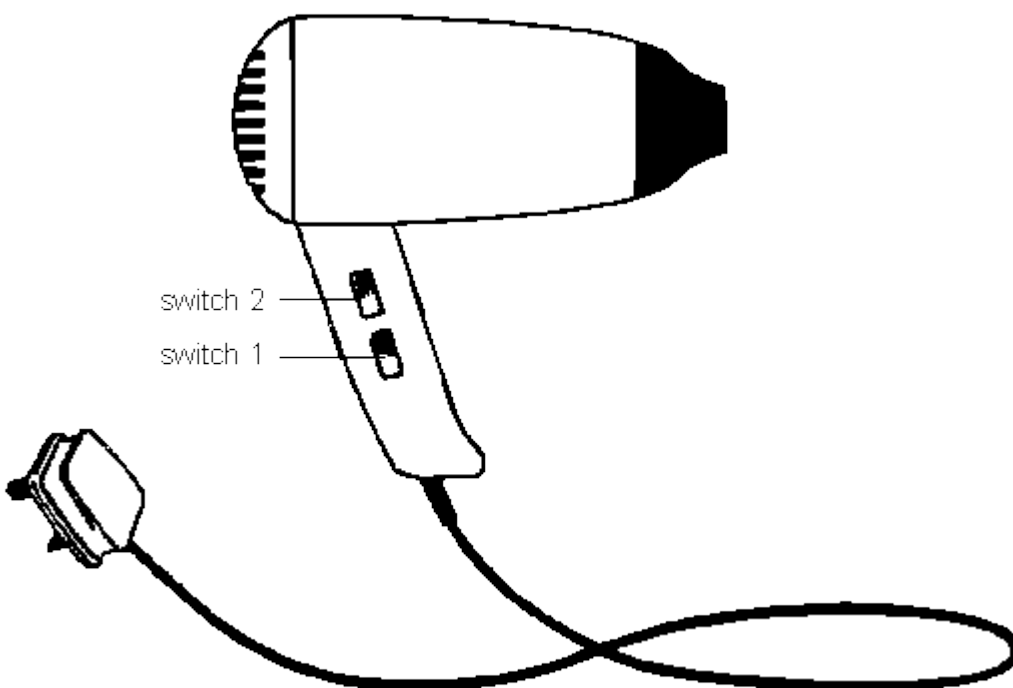
.....
.....

1 mark

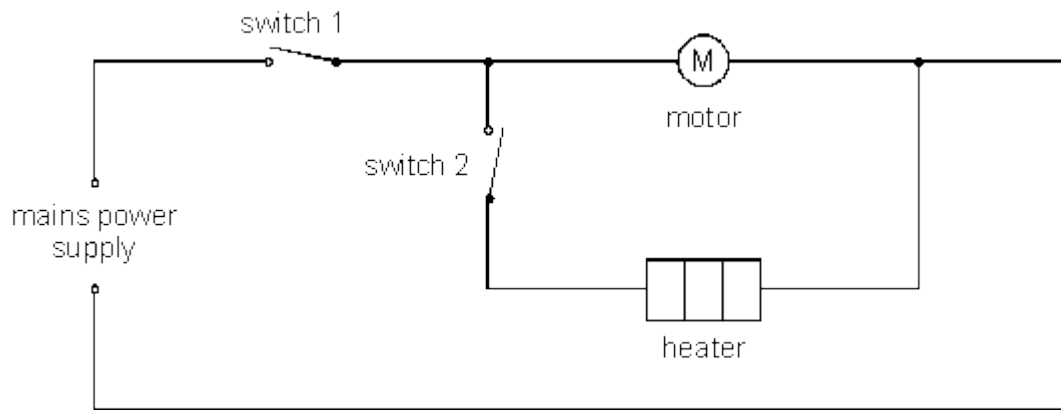
Maximum 5 marks

6

The drawing shows a hairdryer.



Ben drew the diagram below to show the circuit of the hairdryer.



(a) Which of the switches must be closed for the heater to work? Tick the correct box.

- | | | | |
|--------------------------|--------------------------|--------------------------|---------------------------|
| switch
1 only | switch
2 only | switches
1 and 2 | neither switch
1 nor 2 |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

1 mark

(b) With this circuit, is it possible to have the heater on when the motor is switched off?

... ..

Explain your answer.

... ..

1 mark

(c) The motor and the heater are both on. The motor blows air through the hairdryer. If the motor breaks, what would happen to the temperature of the hairdryer?

... ..

1 mark

(d) The motor and the heater are both on. Suddenly the wire in the heater breaks. What effect, if any, will this have on the motor?

... ..

1 mark
 Maximum 4 marks