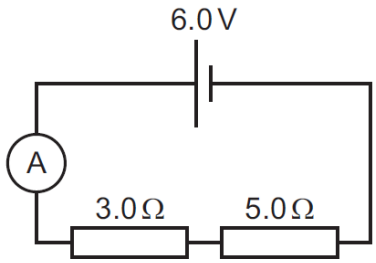
Electricity – 2021 IGCSE 0625

1. June/2021/Paper_11/No.30

The circuit diagram shows a cell connected to an ammeter and two resistors.

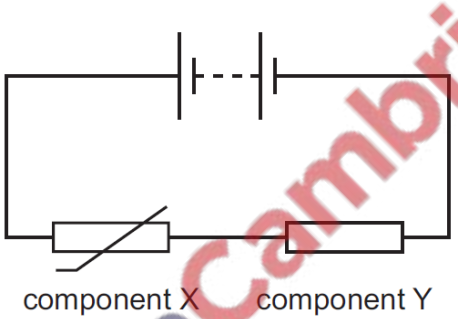


What is the current in the circuit?

A 0.75 A **B** 1.3 A **C** 12 A **D** 48 A

2. June/2021/Paper_11/No.31

The diagram shows an electrical circuit.



Which row describes what happens when the temperature rises?

	resistance of component X	potential difference (p.d.) across component Y
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

3. June/2021/Paper_11/No.32

Diagram 1 shows a resistor connected in a circuit. Diagram 2 shows an identical resistor connected in parallel with the first one.

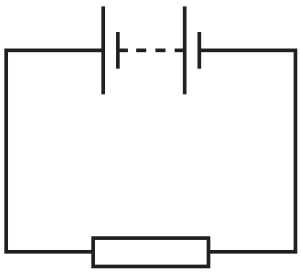


diagram 1

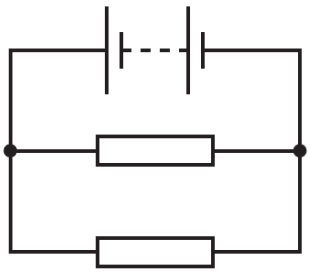


diagram 2

What is the combined resistance of the two resistors?

A greater than in the circuit of diagram 1

B less than in the circuit of diagram 1

C the same as in the circuit of diagram 1

D zero

4. June/2021/Paper_11/No.33

The current in a lamp connected on its own to the mains supply is 0.60 A.

A table decoration has three of these lamps connected in parallel.

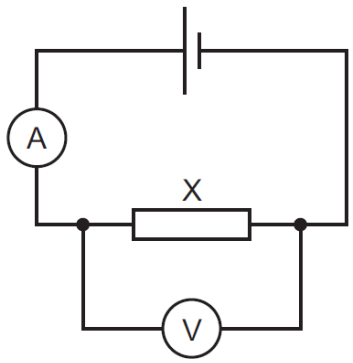
Which rating of fuse is suitable to protect this circuit?

A 0.2 A **B** 0.6 A **C** 1.0 A **D** 5.0 A

5. June/2021/Paper_12/No.30

A student connects a circuit with a resistor X. The reading on the ammeter is 2.0 A.

The reading on the voltmeter is 6.0 V.



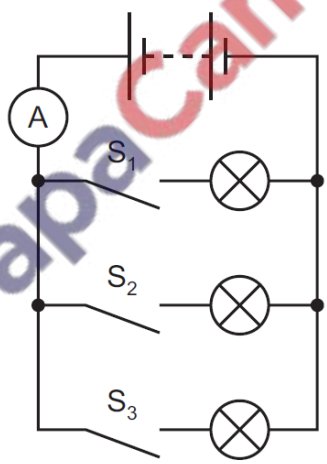
She needs to produce a circuit with a total resistance of 10 Ω.

Which resistor should she add in series to the circuit?

A 2 Ω **B** 3 Ω **C** 7 Ω **D** 10 Ω

6. June/2021/Paper_12/No.31

The diagram shows a circuit containing a battery, an ammeter, three switches, S_1, S_2 and S_3, and three identical lamps.



With only switch S_1 closed, the reading on the ammeter is 0.04 A.

Which row states the **incorrect** ammeter reading for the switch conditions given?

	switch S_1	switch S_2	switch S_3	ammeter reading / A
A	open	open	open	0.00
B	open	closed	open	0.04
C	open	open	closed	0.08
D	closed	closed	closed	0.12

7. June/2021/Paper_12/No.32

Two 10 Ω resistors are connected in series and then in parallel.

What is the combined resistance in each case?

	resistance in series / Ω	resistance in parallel / Ω
A	10	5
B	10	10
C	20	5
D	20	10

8. June/2021/Paper_12/No.33

The information on the back of a television is shown.

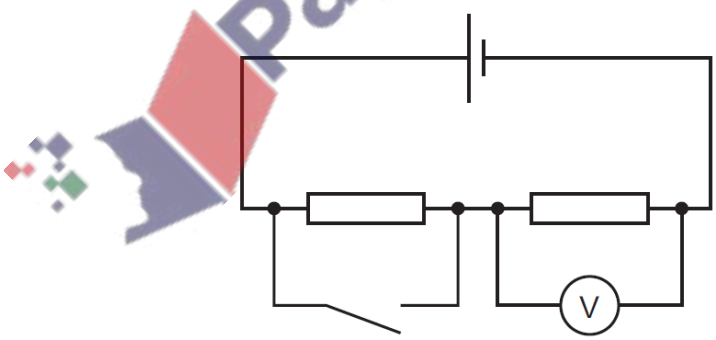
220–240 V
~50 Hz
0.6 A

Which fuse provides the best protection for the circuit?

A 0.5 A **B** 1 A **C** 5 A **D** 13 A

9. June/2021/Paper_13&23/No.31

The diagram shows a circuit containing a cell, two resistors, a switch and a voltmeter.



When the switch is open the voltmeter reads 1.5 V.

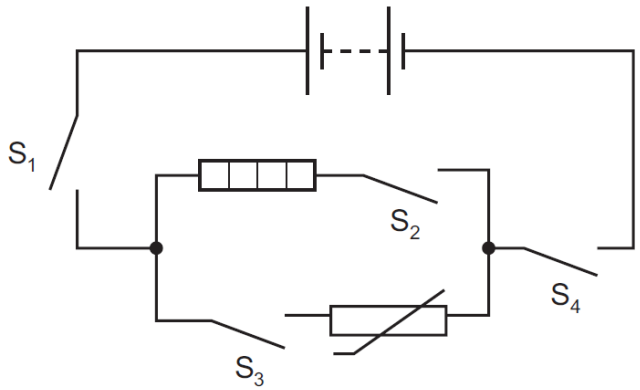
When the switch is closed the voltmeter reads 2.0 V.

What is the electromotive force (e.m.f.) of the cell?

A 0.5 V **B** 1.5 V **C** 2.0 V **D** 3.5 V

10. June/2021/Paper_13/No.32

The circuit in the diagram contains four switches, S_1, S_2, S_3 and S_4.



Which three switches must be closed for the heater to work?

A S_1, S_2 and S_3

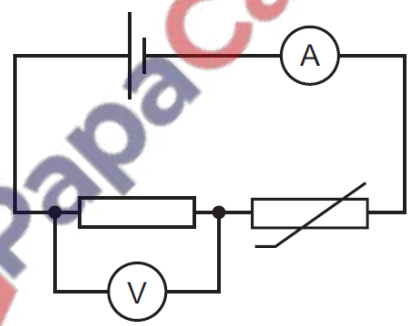
B S_1, S_2 and S_4

C S_1, S_3 and S_4

D S_2, S_3 and S_4

11. June/2021/Paper_13/No.33

The diagram shows a circuit.



What happens to the readings on the voltmeter and on the ammeter when the temperature of the thermistor increases?

	voltmeter reading	ammeter reading
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

12. June/2021/Paper_21/No.31

Which statement about the resistance of a metal wire is correct?

A The resistance is directly proportional to its length and directly proportional to its cross-sectional area.

B The resistance is directly proportional to its length and inversely proportional to its cross-sectional area.

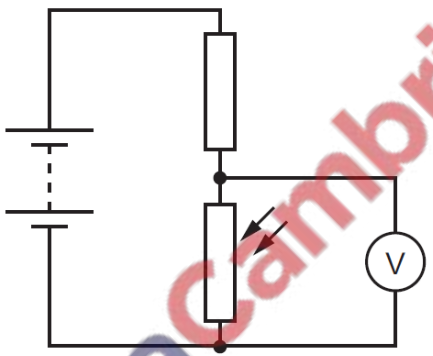
C The resistance is inversely proportional to its length and directly proportional to its cross-sectional area.

D The resistance is inversely proportional to its length and inversely proportional to its cross-sectional area.

13. June/2021/Paper_21/No.32

The circuit diagram shows a light-dependent resistor (LDR) in a potential divider.

A voltmeter is connected across the LDR.

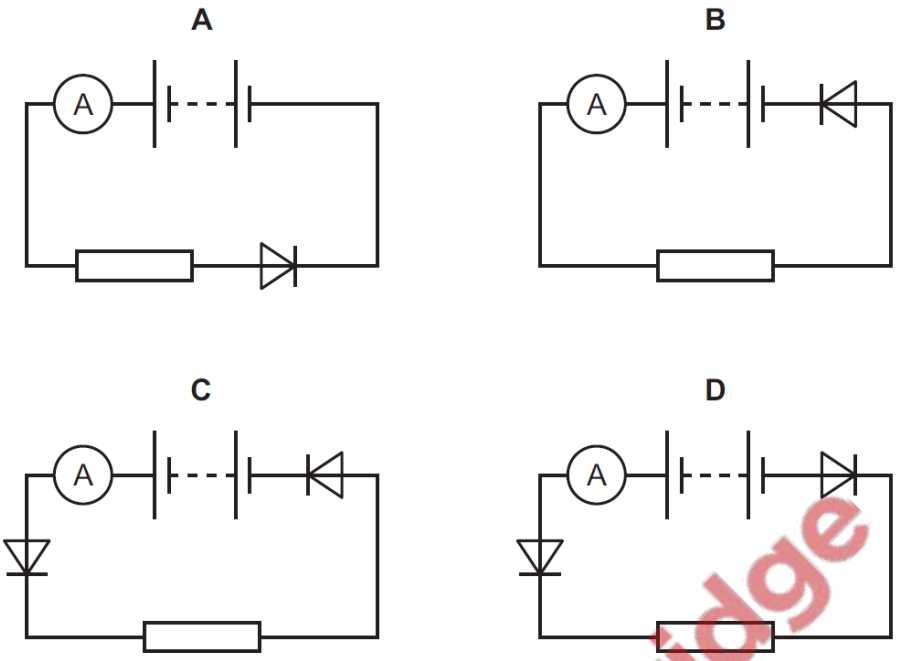


Which row shows the resistance of the LDR and the potential difference (p.d.) shown on the voltmeter at a specific light level?

	light level	resistance of LDR	p.d. shown on the voltmeter
A	bright	low	high
B	bright	high	low
C	dim	high	high
D	dim	low	low

14. June/2021/Paper_22/No.32

Which circuit has a zero reading on the ammeter?



15. June/2021/Paper_22/No.33

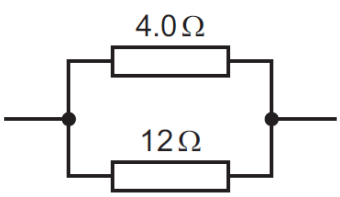
Two 10 Ω resistors are connected in series and then in parallel.

What is the combined resistance in each case?

	resistance in series / Ω	resistance in parallel / Ω
A	10	5
B	10	10
C	20	5
D	20	10

16. June/2021/Paper_23/No.32

A 4.0 Ω resistor and a 12 Ω resistor are connected in parallel.



What is the effective resistance of this combination of resistors?

A 0.33 Ω **B** 3.0 Ω **C** 8.0 Ω **D** 16 Ω

17. March/2021/Paper_12/No.31

A length of metal wire is used as a resistor in a circuit.

Which change to the wire results in an increase in current in the circuit?

A connecting a second identical length of wire in parallel with the original wire

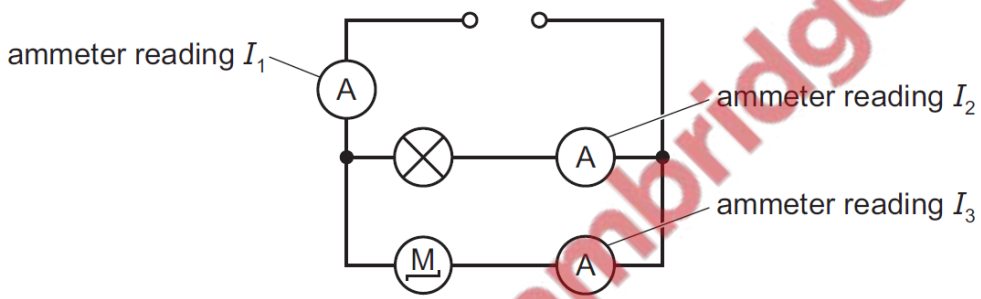
B connecting a second identical length of wire in series with the original wire

C decreasing the thickness of the wire

D increasing the length of the wire

18. March/2021/Paper_12/No.32

The diagram shows a circuit containing a power supply, a lamp and a motor. Three ammeters measure the current at different points in the circuit. The readings on the ammeters are I_1, I_2 and I_3.



Which statement about the ammeter readings is correct?

A All three readings are the same.

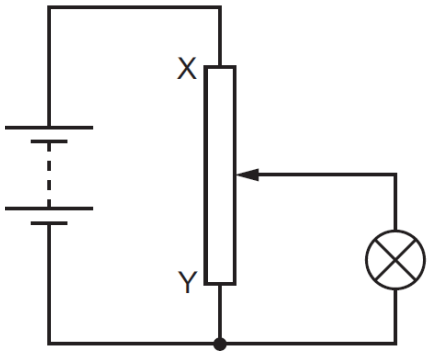
B I_1 is greater than I_2 and is greater than I_3.

C I_2 is greater than I_1 and is greater than I_3.

D I_3 is greater than I_1 and is greater than I_2.

19. March/2021/Paper_12/No.33

A student designs a circuit to use as a dimmer switch for a lamp.



What happens to the brightness of the lamp and the potential difference (p.d.) across the lamp, when the slider is moved from X to Y?

	brightness of lamp	p.d. across the lamp
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

20. March/2021/Paper_12/No.34

Which electrical component is connected in series with an electric circuit to protect it from damage by a very large current?

A earth wire

B fuse

C relay

D thermistor

21. March/2021/Paper_22/No.31

Which two changes to a metal wire both decrease its resistance?

	length of wire	cross-sectional area of wire
A	decrease	decrease
B	decrease	increase
C	increase	decrease
D	increase	increase

22. March/2021/Paper_22/No.32

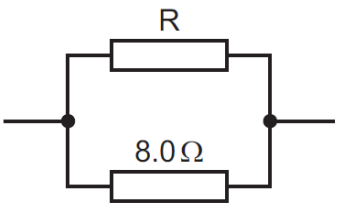
There is a current I in a resistor of resistance R for a time t. The potential difference across the resistor is V.

Which equation gives the energy E transferred by the resistor?

A $E = IR$ **B** $E = IV$ **C** $E = IRt$ **D** $E = IVt$

23. March/2021/Paper_22/No.33

A resistor R is connected in parallel with an 8.0 Ω resistor. The resistance of this combination is 4.0 Ω.

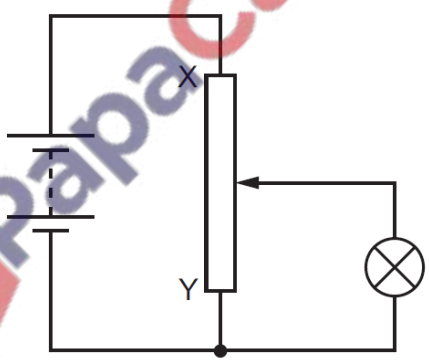


What is the resistance of resistor R?

A 0.50 Ω **B** 2.0 Ω **C** 4.0 Ω **D** 8.0 Ω

24. March/2021/Paper_22/No.34

A student designs a circuit to use as a dimmer switch for a lamp.



What happens to the brightness of the lamp and the potential difference (p.d.) across the lamp, when the slider is moved from X to Y?

	brightness of lamp	p.d. across the lamp
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

25. June/2021/Paper_31/No.10

(a) Fig. 10.1 shows a lamp and a resistor connected in a circuit.

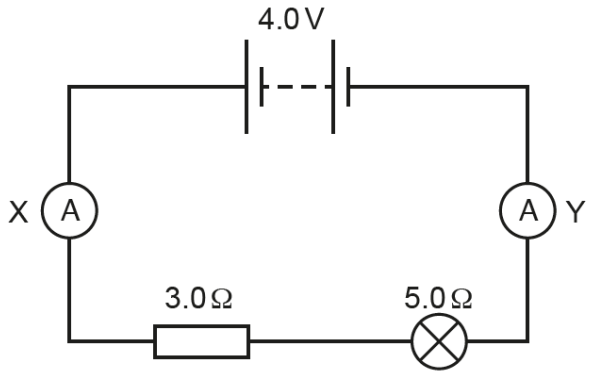


Fig. 10.1

(i) Determine the combined resistance of the 3.0 Ω resistor and the 5.0 Ω lamp.

combined resistance = ... Ω [1]

(ii) The reading on ammeter X is 0.50 A.

State the reading on ammeter Y.

reading on ammeter Y = ... A [1]

(b) In another circuit, the 3.0 Ω resistor and the 5.0 Ω lamp are connected in parallel, as shown in Fig. 10.2.

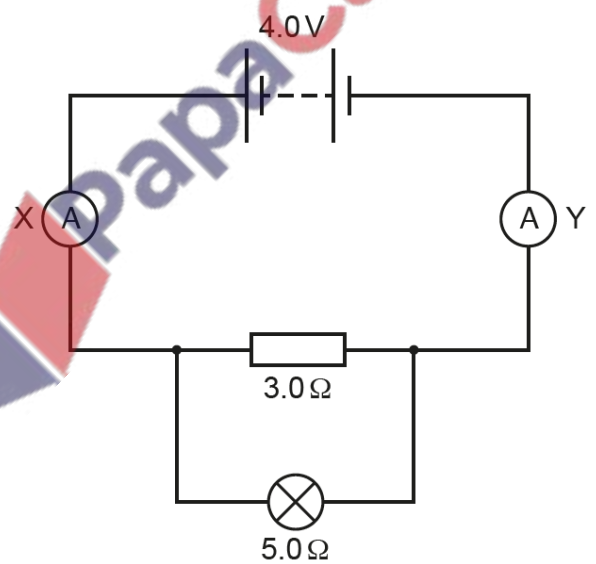


Fig. 10.2

The lamp and resistor have changed from a series to a parallel combination.

State and explain the effect of this change on the current in ammeter X.

.....

.....

.....

..... [3]

(c) The current in a different lamp is 0.40 A when the potential difference (p.d.) across the lamp is 6.0 V.

Calculate the resistance of the lamp.

resistance of lamp = ... Ω [3]

[Total: 8]

26. June/2021/Paper_32/No.9

(a) Fig. 9.1 shows an electric circuit.

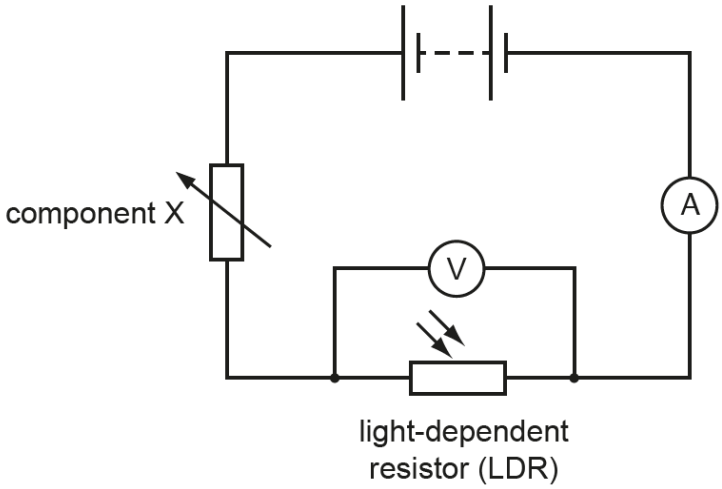


Fig. 9.1

(i) The current in the metal wires of the circuit is a flow of particles.
State the name of these particles.

..... [1]

(ii) State the name of component X.

..... [1]

(iii) The circuit is in a darkened room. The voltmeter reading is 5.5V and the ammeter reading is 0.050A.

Calculate the resistance of the light-dependent resistor (LDR).

resistance = ... Ω [3]

(b) The light in the room is switched on. The room becomes bright.

State and explain how increasing the brightness of the light that falls on the LDR changes the current in the circuit.

.....

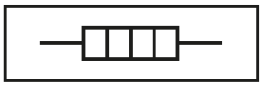
..... [2]

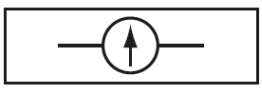
[Total: 7]

27. June/2021/Paper_33/No.10

(a) Fig. 10.1 shows the circuit symbols for three electrical components.

Draw a line from each circuit symbol to the correct electrical component.





fuse

heater

variable resistor

galvanometer

thermistor

Fig. 10.1

[3]

(b) Fig. 10.2 shows a circuit consisting of a battery, a fixed resistor and an ammeter.

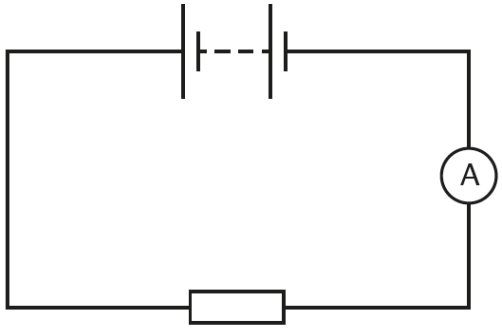


Fig. 10.2

(i) A voltmeter is connected in the circuit to measure the potential difference (p.d.) across the fixed resistor.

By drawing on Fig. 10.2, show how the voltmeter is connected. Use the correct circuit symbol for the voltmeter. [2]

(ii) The potential difference (p.d.) across the fixed resistor is 11.5 V. The reading on the ammeter is 0.25 A.

Calculate the resistance of the fixed resistor.

Include the unit in your answer.

resistance = ... unit ..... [4]

[Total: 9]

28. June/2021/Paper_41/No.8

A student sets up a circuit that includes a 12 V battery, an 800 Ω resistor, a voltmeter and a thermistor. Fig. 8.1 is an incomplete circuit diagram because the symbol for the thermistor is missing.

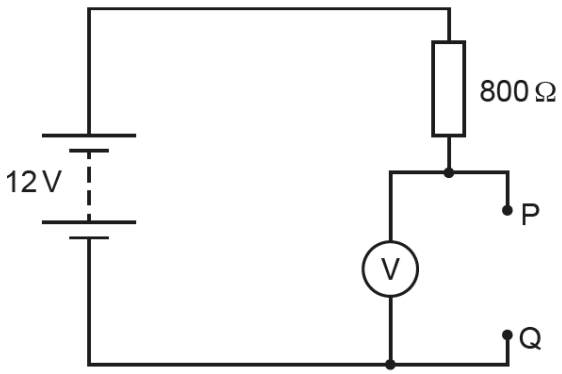


Fig. 8.1

The thermistor is connected between terminals P and Q.

(a) Complete Fig. 8.1 by drawing the symbol for a thermistor between terminals P and Q. [1]

(b) The 12 V battery consists of eight identical cells connected in series.

Calculate the electromotive force (e.m.f.) of each cell.

e.m.f. = ... [1]

(c) The reading on the voltmeter is 8.0 V.

(i) Determine the resistance of the thermistor.

resistance = ... [3]

(ii) A few hours later, the student notices that the reading on the voltmeter is greater.

Explain what can be deduced from this observation.

.....

.....

.....

..... [3]

[Total: 8]

29. June/2021/Paper_42/No.9

(a) Fig. 9.1 shows a circuit.

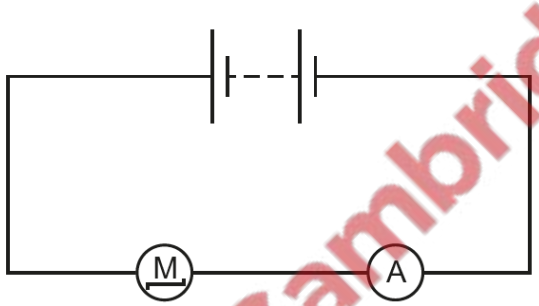


Fig. 9.1

On Fig. 9.1, draw **two** clearly labelled arrows to show the direction of the electron flow and the direction of the conventional current in the circuit. [2]

(b) The current in the motor is 13A. The charge on an electron is 1.6×10^{-19} C.

Calculate the number of electrons that pass through the motor every second.

number of electrons = ... [3]

[Total: 5]

30. June/2021/Paper_42/No.10

(a) Fig. 10.1 shows the potential difference–current graph for a circuit component K.

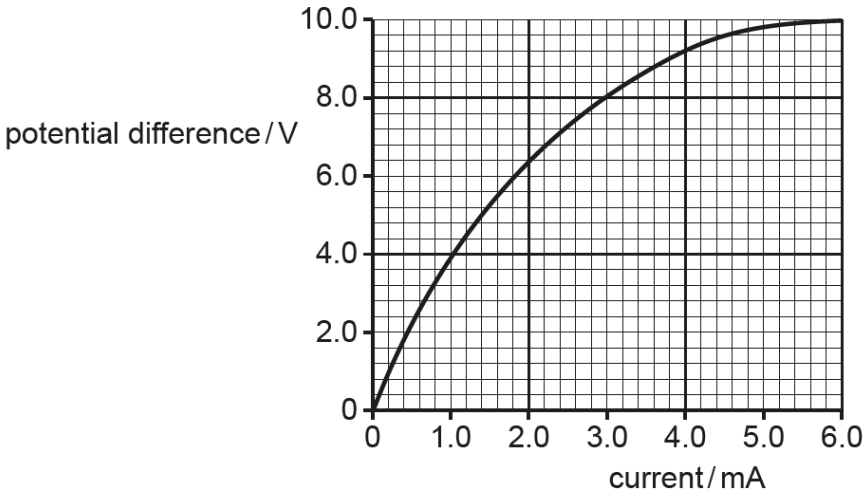


Fig. 10.1

Calculate the resistance of component K when the current in it is 4.0 mA.

resistance = ... [2]

(b) Fig. 10.2 shows a circuit containing component K.

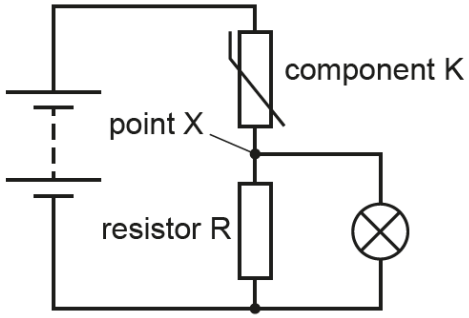


Fig. 10.2

At low temperature, component K has a much greater resistance than resistor R.

At high temperature, component K has a much smaller resistance than resistor R.

State and explain the effect on the lamp when the temperature changes from very low to very high.

Refer to the voltage at point X in your explanation.

statement .....

explanation .....

.....

.....

.....

..... [4]

(c) State the name of component K.

..... [1]

[Total: 7]

31. June/2021/Paper_43/No.7

(a) Define *electromotive force* (*e.m.f.*).

.....

.....

..... [2]

(b) Fig. 7.1 shows a circuit.

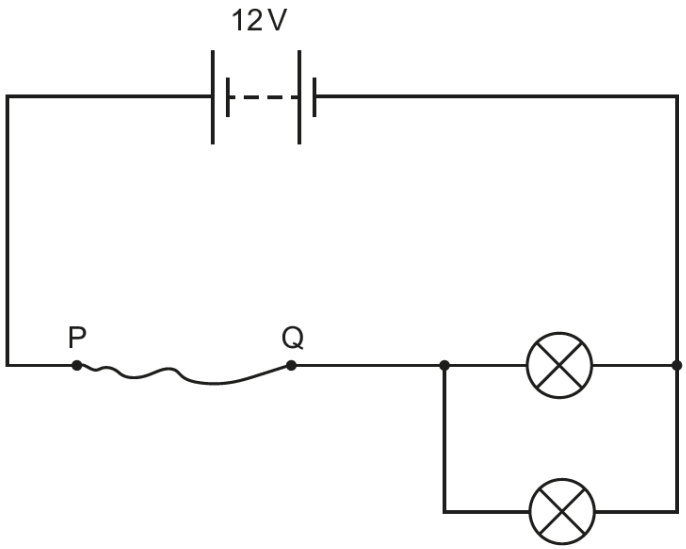


Fig. 7.1

The two lamps shown are identical. Each lamp has a potential difference (p.d.) of 3.0 V across it and a current of 2.0 A in it. PQ is a length of uniform metal wire. The resistance of PQ is *R*.

(i) Calculate the value of *R*.

R = ... [3]

(ii) Another piece of wire is made of the same metal as PQ. The length of the new piece of wire is twice the length of PQ. The diameter of the new piece of wire is twice the diameter of PQ.

Calculate the resistance of the new piece of wire.

resistance = ... [3]

[Total: 8]

32. March/2021/Paper_32/No.9

Fig. 9.1 shows an electric circuit.

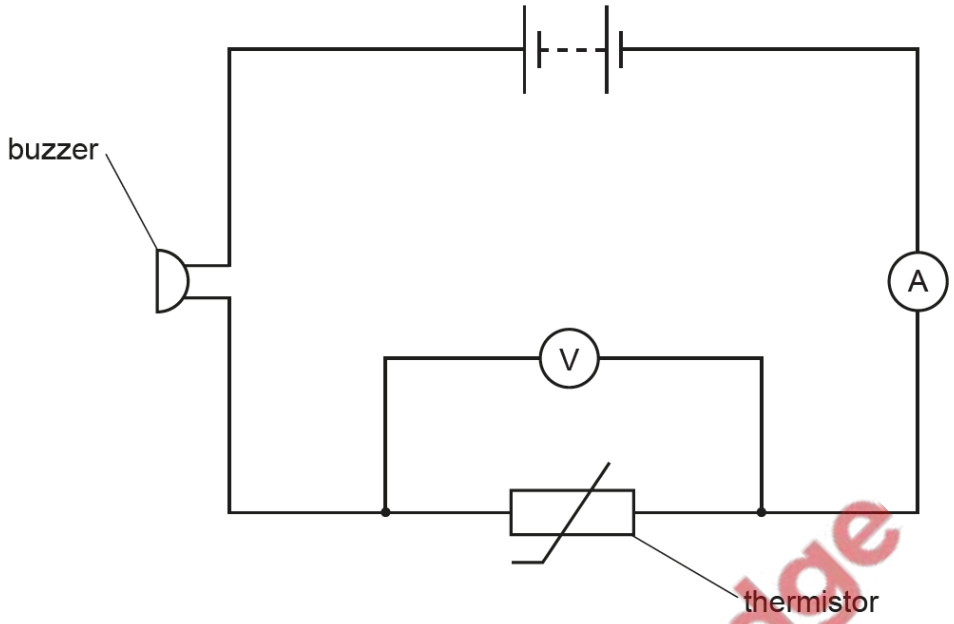


Fig. 9.1

(a) When the circuit is in a cool room, the voltmeter reading is 5.6 V and the ammeter reading is 0.040 A.

Calculate the resistance of the thermistor.

resistance of thermistor = ... Ω [3]

(b) The temperature of the thermistor increases and the buzzer turns on.

State and explain how the increase in temperature affects the current in the thermistor.

.....

..... [2]

(c) Suggest a possible use for the circuit shown in Fig. 9.1.

..... [1]

[Total: 6]

33. March/2021/Paper_42/No.8

(a) Define electromotive force (e.m.f.).

.....

..... [1]

(b) Fig. 8.1 shows a source E of e.m.f. 60 V in a circuit.

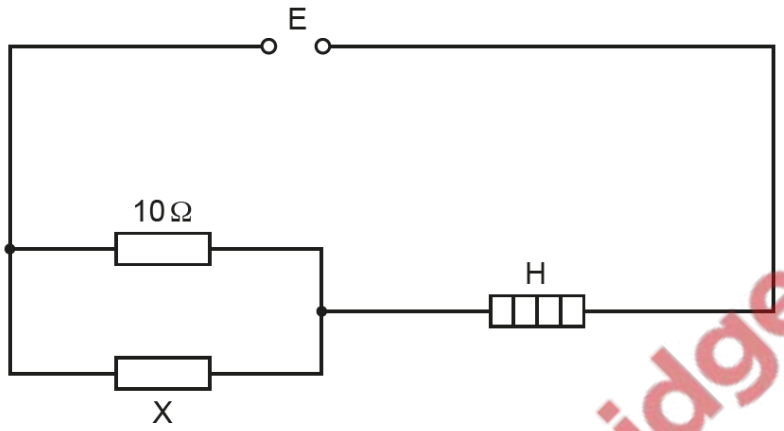


Fig. 8.1

The heater H has a resistance of 22.5 Ω and the potential difference (p.d.) across it is 45 V.

Calculate:

(i) the power of the heater

power = ... [3]

(ii) the p.d. across resistor X

p.d. = ... [2]

(iii) the current in the 10 Ω resistor.

current = ... [2]

[Total: 8]