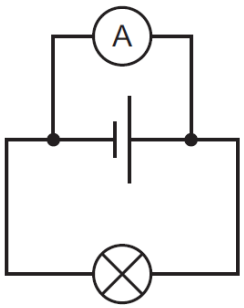
Electricity – 2021 IGCSE 0625

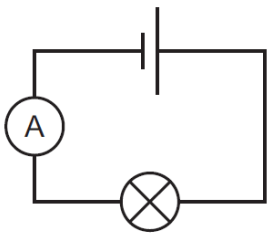
1. Nov/2021/QPaper_11/No.26

In which circuit is the ammeter measuring the flow of charge through the lamp?

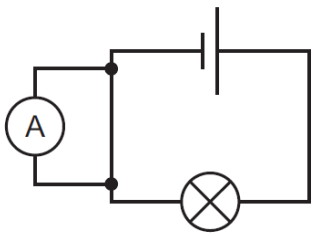
A



B



C



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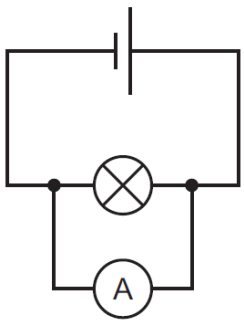
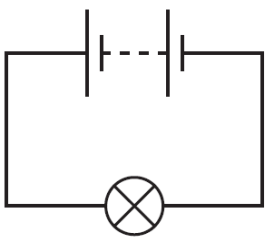


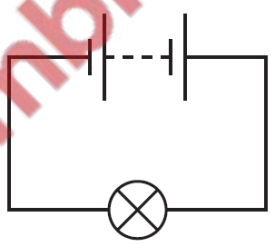
2. Nov/2021/QPaper_11/No.27

In circuit 1, a negative charge flows in a clockwise direction. The bulb is bright.

In circuit 2, the battery is reversed as shown. The bulb is equally bright.



circuit 1



circuit 2

Which charge flows in circuit 2 and in which direction?

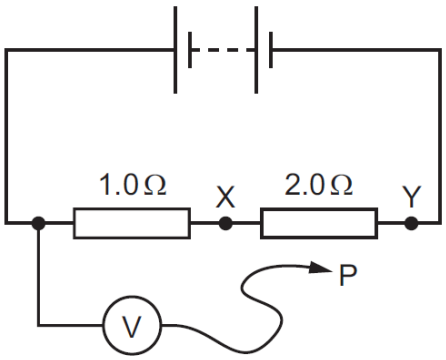
	charge	direction
A	negative	anticlockwise
B	negative	clockwise
C	positive	anticlockwise
D	positive	clockwise

3. Nov/2021/QPaper_11/No.28

The diagram shows a circuit containing two resistors of resistance 1.0 Ω and 2.0 Ω.

A voltmeter is connected across the 1.0 Ω resistor by connecting P to X.

The reading on the voltmeter is 6.0 V.



P is moved to point Y in the circuit.

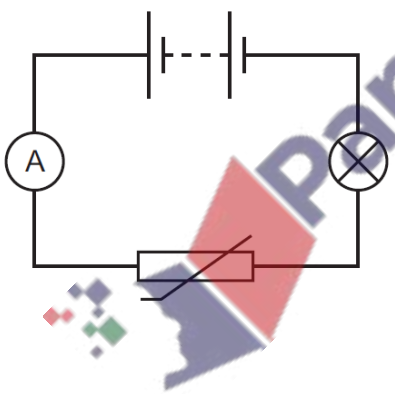
What is the new reading on the voltmeter?

A 3.0 V **B** 6.0 V **C** 12 V **D** 18 V

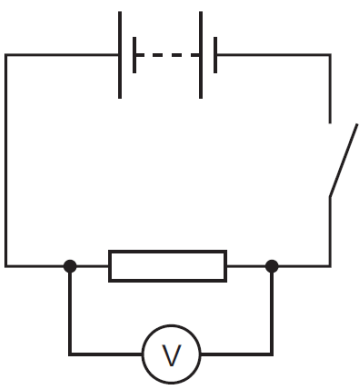
4. Nov/2021/QPaper_11,12&13/No.30

Which circuit contains a fuse?

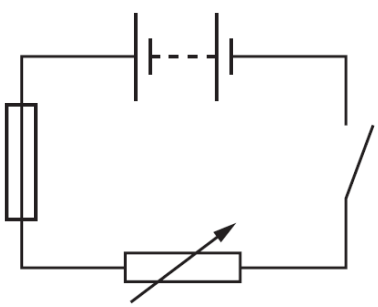
A



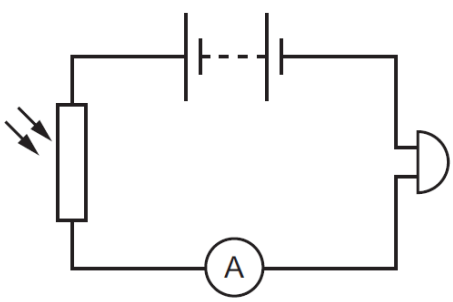
B



C

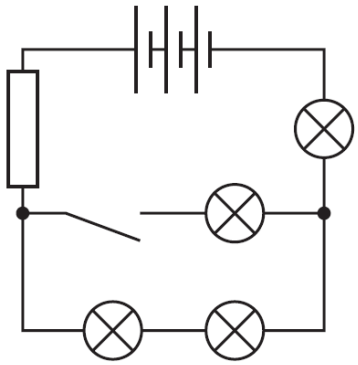


D



5. Nov/2021/QPaper_11/No.31

The diagram shows an electric circuit.



Which row correctly shows the numbers of different components in the circuit?

	cells	lamps	switches
A	1	1	4
B	1	4	1
C	3	1	4
D	3	4	1

6. Nov/2021/QPaper_11/No.33

The metal cases of electrical appliances are connected to an earth wire.

Which statement is **not** correct?

A The live wire may become loose and touch the metal case.

B If the metal case becomes live, the earth wire conducts current to the ground.

C The earth wire needs to have a high resistance.

D Earthing metal cases helps prevent a person from receiving an electric shock.

7. Nov/2021/QPaper_11/No.34

A teacher asks, 'Why do we put a fuse in a mains circuit?'

Student 1 says, 'It protects the wiring from overheating.' Student 2 says, 'It protects us from getting a shock if we touch the live wire.'

Who is correct?

A both students

B neither student

C student 1 only

D student 2 only

8. Nov/2021/QPaper_11/No.36

The current in a small electric heater is 4.0 A.

The cable connected to the heater is able to carry currents up to 10 A.

Fuses rated 1 A, 3 A, 5 A and 13 A are available.

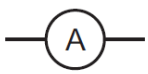
Which fuse should be used?

A 1 A **B** 3 A **C** 5 A **D** 13 A

9. Nov/2021/QPaper_12&22/No.26

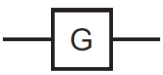
Which circuit symbol represents a component used to measure electric current?

A

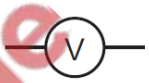


B

C



D



10. Nov/2021/QPaper_12/No.27

Four wires made of the same metal have different lengths and different diameters.

Which wire has the lowest resistance?

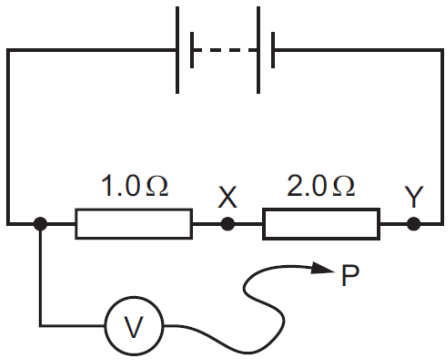
	length	diameter
A	long	large
B	long	small
C	short	large
D	short	small

11. Nov/2021/QPaper_12/No.28

The diagram shows a circuit containing two resistors of resistance 1.0 Ω and 2.0 Ω.

A voltmeter is connected across the 1.0 Ω resistor by connecting P to X.

The reading on the voltmeter is 6.0 V.



P is moved to point Y in the circuit.

What is the new reading on the voltmeter?

A 3.0 V **B** 6.0 V **C** 12 V **D** 18 V

12. Nov/2021/QPaper_12/No.29

Which device is used to measure the flow of charge in an electrical circuit?

A ammeter

B voltmeter

C battery

D newton meter

13. Nov/2021/QPaper_12/No.31

A student designs a circuit to turn on a fan when the temperature increases.

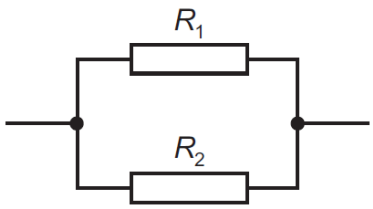
Which component does the student need to use in her circuit?

A **B** **C** **D**

14. Nov/2021/QPaper_11,12,13,21,22&23/No.32

Two resistors, with resistances R_1 and R_2, are connected in parallel.

The resistance R_1 is greater than the resistance R_2.



What is the resistance of the parallel combination?

A less than either R_1 or R_2

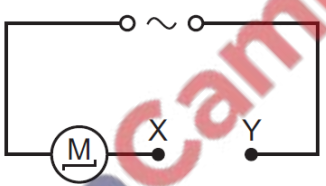
B equal to R_1

C equal to R_2

D the average of R_1 and R_2

15. Nov/2021/QPaper_12&22/No.33

The diagram shows a motor connected to an a.c. supply. The circuit is incomplete.



Which device needs to be connected between point X and point Y to prevent the wires from overheating if a fault in the motor causes the current to get too high?

A an ammeter

B a fuse

C a transformer

D a length of thick copper wire

16. Nov/2021/QPaper_12/No.34

A hairdresser is using a hairdryer with a plastic casing. He notices that there is no wire attached to the earth pin of the plug.

Why is an earth connection **not** needed?

A Plastic is an insulator.

B The hairdresser only touches the handle of the dryer.

C The hairdryer uses a.c. so cannot give the hairdresser a shock.

D Wet hands do not conduct electricity.

17. Nov/2021/QPaper_12/No.36

An electric drill, operating from a supply voltage of 240 V, uses a current of 3.5 A.

Which rating of fuse should be used to protect the drill's cable?

A 250 V **B** 200 V **C** 5 A **D** 3 A

18. Nov/2021/QPaper_13&23/No.26

An electric current in a copper wire is due to the flow of charge.

Which particles are moving along the wire?

A α-particles

B copper nuclei

C electrons

D protons

19. Nov/2021/QPaper_13/No.27

Which row correctly shows a conductor and an insulator?

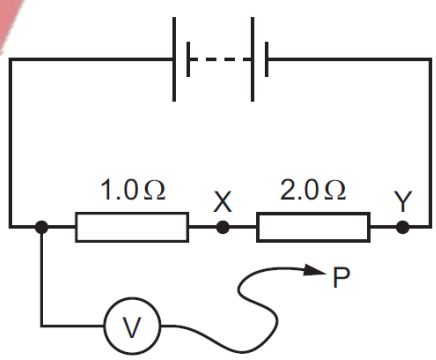
	conductor	insulator
A	rubber	plastic
B	iron	nylon
C	air	wood
D	copper	steel

20. Nov/2021/QPaper_13,21,22&23/No.28

The diagram shows a circuit containing two resistors of resistance 1.0 Ω and 2.0 Ω.

A voltmeter is connected across the 1.0 Ω resistor by connecting P to X.

The reading on the voltmeter is 6.0 V.



P is moved to point Y in the circuit.

What is the new reading on the voltmeter?

A 3.0 V **B** 6.0 V **C** 12 V **D** 18 V

21. Nov/2021/QPaper_13/No.29

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

A ampere

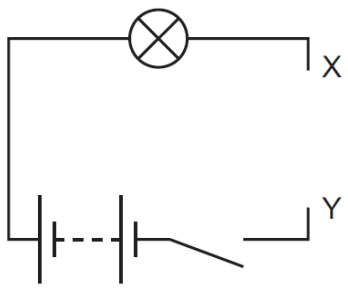
B newton

C ohm

D volt

22. Nov/2021/QPaper_13/No.31

A student sets up the circuit shown, with a gap XY.



The student wishes to connect a component between X and Y to enable her to vary the brightness of the lamp.

Which component should be used?

23. Nov/2021/QPaper_13/No.33

Circuit breakers and fuses are devices used to protect a circuit from overloading.

Which statement correctly describes the difference between a circuit breaker and a fuse?

A Circuit breakers can be reset if they operate but fuses need to be replaced.

B Circuit breakers need to be replaced if they operate but fuses can be reset.

C Circuit breakers can be used in an a.c. circuit but fuses cannot.

D Circuit breakers cannot be used in an a.c. circuit but fuses can.

24. Nov/2021/QPaper_13/No.34

Why might it be dangerous to use an electrical appliance in damp conditions?

A It might lead to the fuse blowing.

B It might lead to the insulation on the supply cable becoming damaged.

C It might lead to an electric shock.

D It might lead to the supply cable overheating.

25. Nov/2021/QPaper_13/No.36

When wiring a house, it is important to use the correct cables.

The current ratings of four different cables are listed.

All four cables are used in series in the same circuit.

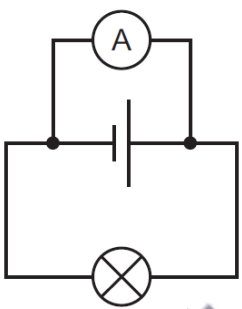
Which cable is most likely to overheat?

A 6 A **B** 10 A **C** 15 A **D** 30 A

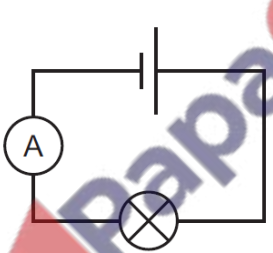
26. Nov/2021/QPaper_21/No.26

In which circuit is the ammeter measuring the flow of charge through the lamp?

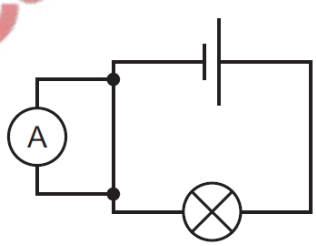
A



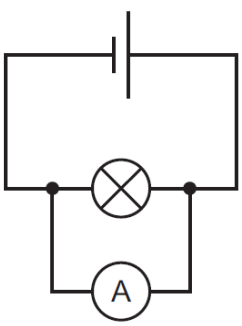
B



C



D

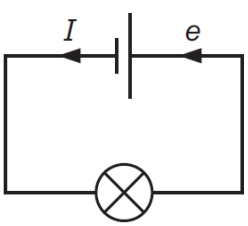


27. Nov/2021/QPaper_21/No.27

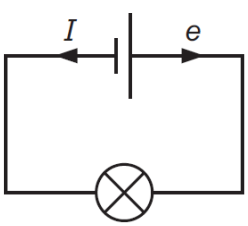
A lamp is connected to a cell.

Which circuit diagram shows the direction of conventional current I and also the direction of flow of electrons e?

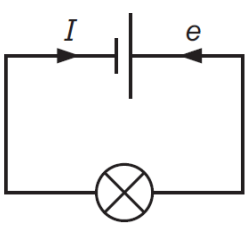
A



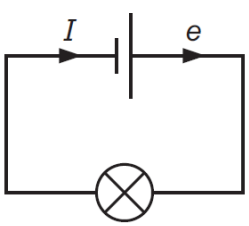
B



C

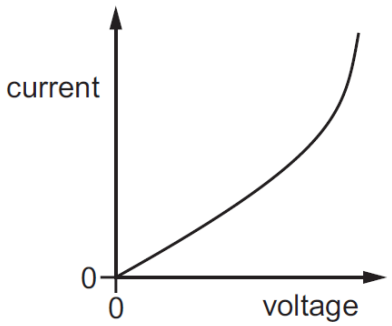


D



28. Nov/2021/QPaper_21/No.29

The graph shows the current–voltage relationship for a circuit component X.

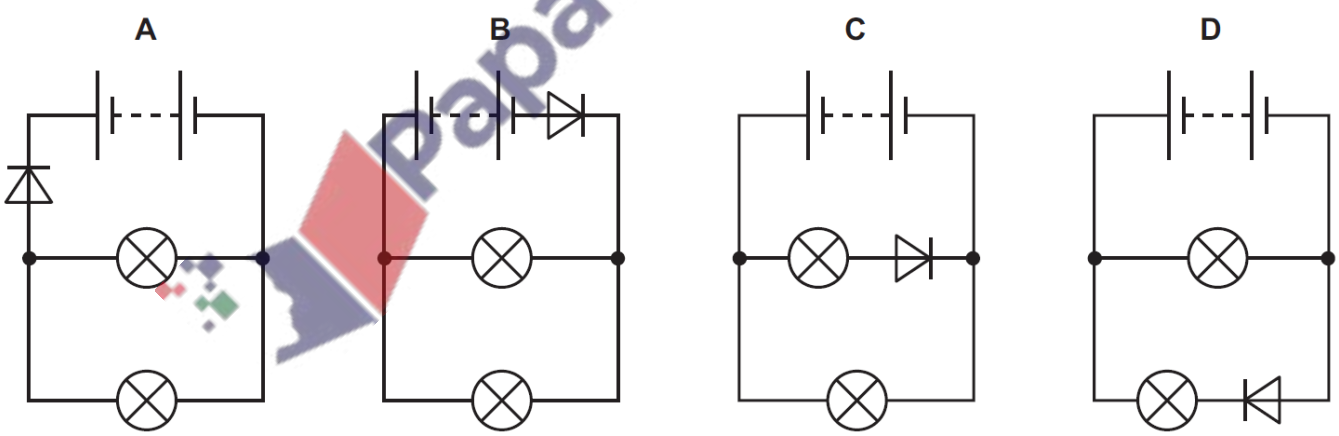


What happens to the resistance of X and what happens to the temperature of X as the voltage increases?

	resistance of X	temperature of X
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

29. Nov/2021/QPaper_21/No.31

In which circuit do both lamps light?



30. Nov/2021/QPaper_21/No.33

The metal cases of electrical appliances are connected to an earth wire.

Which statement is **not** correct?

A The live wire may become loose and touch the metal case.

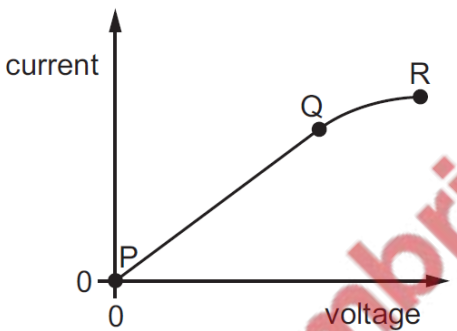
B If the metal case becomes live, the earth wire conducts current to the ground.

C The earth wire needs to have a high resistance.

D Earthing metal cases helps prevent a person from receiving an electric shock.

31. Nov/2021/QPaper_22/No.27

The graph shows the current–voltage characteristic for a conductor.



Where on the graph can Ohm's law be applied to the conductor?

A at Q only

B between P and Q

C between P and R

D between Q and R

32. Nov/2021/QPaper_22/No.29

There is a current I in a resistor. The potential difference (p.d.) across the resistor is V.

Which other physical quantity is needed to be able to determine the energy transferred W by the resistor?

A the electromotive force (e.m.f.) E of the source

B the power P dissipated

C the resistance R of the resistor

D the time t for which there is a current in the resistor

33. Nov/2021/QPaper_22/No.31

Several cells are connected in series, as shown.

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

A the average of the e.m.f.s of the separate cells

B the e.m.f. of one of the cells

C the product of the e.m.f.s of the cells

D the sum of the e.m.f.s of the cells

34. Nov/2021/QPaper_23/No.27

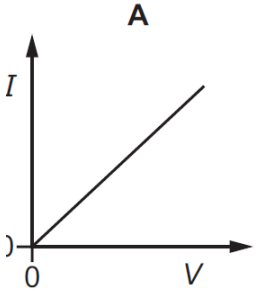
Which row is correct?

	definition of current I	direction of conventional current
A	$I = \frac{Q}{t}$	from positive terminal to negative terminal
B	$I = \frac{Q}{t}$	from negative terminal to positive terminal
C	$I = Q \times t$	from positive terminal to negative terminal
D	$I = Q \times t$	from negative terminal to positive terminal

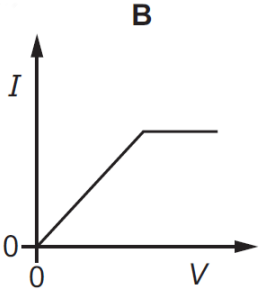
35. Nov/2021/QPaper_23/No.29

Which graph shows the current–voltage characteristic for a filament lamp?

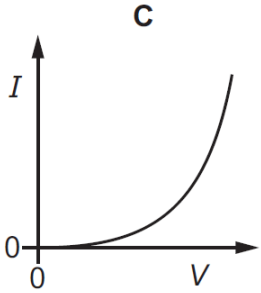
A



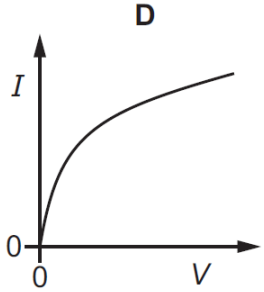
B



C



D



36. Nov/2021/QPaper_23/No.31

Two 3.0 Ω resistors and one 6.0 Ω resistor are connected in series with a cell.

Which statement is correct?

A The current in the cell is equal to the current in the resistors.

B The current in the cell is greater than the current in the resistors.

C The potential difference (p.d.) across each resistor is equal to the p.d. across the cell.

D The potential differences across each resistor are equal.

37. Nov/2021/QPaper_23/No.33

Circuit breakers and fuses are devices used to protect a circuit from overloading.

Which statement correctly describes the difference between a circuit breaker and a fuse?

A Circuit breakers can be reset if they operate but fuses need to be replaced.

B Circuit breakers need to be replaced if they operate but fuses can be reset.

C Circuit breakers can be used in an a.c. circuit but fuses cannot.

D Circuit breakers cannot be used in an a.c. circuit but fuses can.

38. Nov/2021/Paper_31/No.9

This question is about electric circuits.

(a) (i) State the name of the instrument used to measure potential difference (p.d.) in an electric circuit.

..... [1]

(ii) State the unit for the electromotive force (e.m.f.) of a battery.

..... [1]

(b) (i) A student connects a circuit to determine the resistance of a wire. The current in the wire is 0.20 A when the potential difference across the wire is 6.4 V.

Calculate the resistance of the wire.

resistance = ... Ω [3]

(ii) The student has some wires of the same material as those in **(b)(i)** but of various lengths and thicknesses. He wants a wire with higher resistance than the wire in **(b)(i)**.

State **two** ways of identifying a wire with a higher resistance by comparing its length and thickness with the wire in **(b)(i)**.

1 .....

2 .....

[2]

[Total: 7]

39. Nov/2021/Paper_32/No.10

(a) Fig. 10.1 shows two resistors connected in series with a cell and three ammeters.

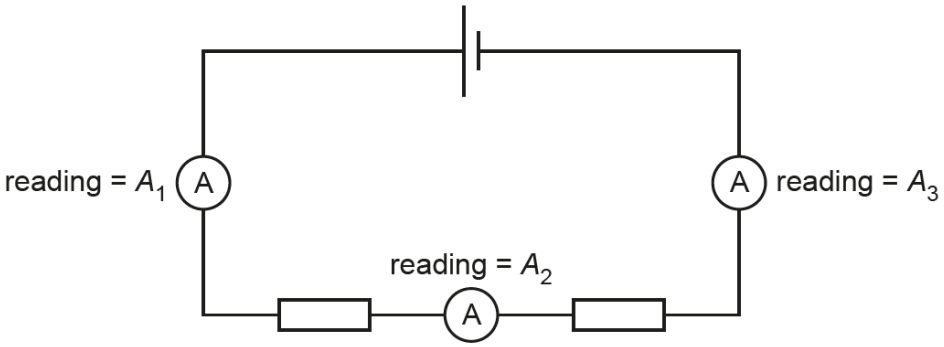


Fig. 10.1

(i) State the physical quantity that an ammeter measures.

..... [1]

(ii) Indicate the correct statement about the readings A_1, A_2 and A_3 on the ammeters in Fig. 10.1.

Tick **one** box.

A_2 is greater than A_1	
A_2 is less than A_3	
A_1 is equal to A_3	
A_1 is equal to $(A_2 + A_3)$	

[1]

(b) **(i)** Draw a circuit diagram for a battery connected to two resistors in parallel.

[2]

(ii) State **one** advantage of connecting lamps in parallel.

..... [1]

(c) Fig. 10.2 shows another circuit.

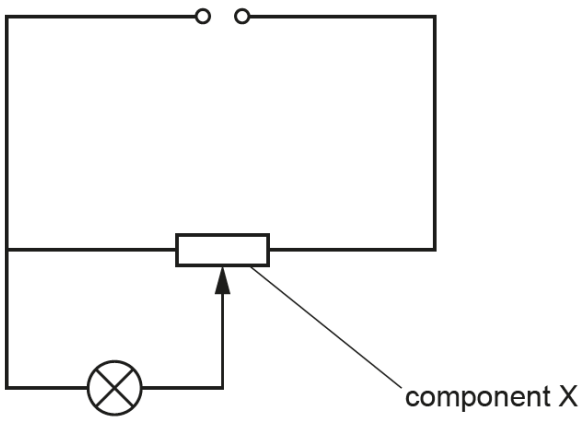


Fig. 10.2

The circuit consists of a power supply, a lamp and component X.

(i) Name component X in Fig. 10.2.

..... [1]

(ii) Suggest **one** use of the circuit.

..... [1]

(iii) Describe how to use component X and explain its effect on the circuit.

.....

.....

..... [2]

[Total: 9]

40. Nov/2021/Paper_33/No.9

(a) The circuit diagrams in Fig. 9.1 and Fig. 9.2 each show two resistors connected to a battery.

Fig. 9.1 shows two resistors connected in series.

Fig. 9.2 shows two resistors connected in parallel.

All the resistors have the same resistance. Ignore the resistance of the ammeters.

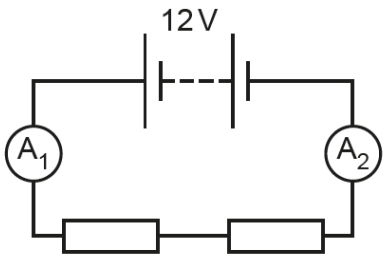


Fig. 9.1

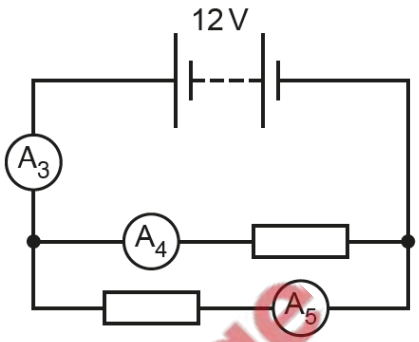


Fig. 9.2

Compare the currents in the ammeters by completing the sentences.

(i) The current in A_1 is ..... the current in A_2. [1]

(ii) The current in A_3 is ..... the current in A_4. [1]

(iii) The current in A_4 is ..... the current in A_5. [1]

(iv) The current in A_1 is ..... the current in A_3. [1]

(b) The lights in a room are connected in parallel with a power supply.

State **one** advantage of connecting the lights in parallel.

..... [1]

(c) The circuit diagram in Fig. 9.3 shows a resistor Q connected to a battery.

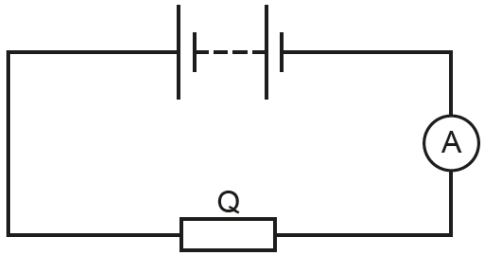


Fig. 9.3

The current in resistor Q is 0.048A. The potential difference (p.d.) across resistor Q is 12V.

Calculate the resistance of resistor Q. Include the unit in your answer.

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

[Total: 9]

41. Nov/2021/Paper_41/No.8

A circuit contains two fixed resistors and a light-dependent resistor (LDR). Fig. 8.1 shows that the power supply is a 9.0 V battery.

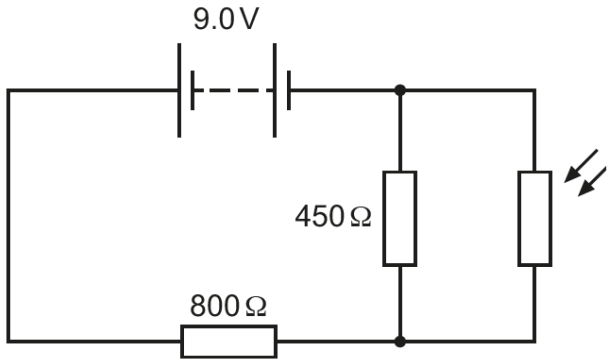


Fig. 8.1

The current in the 450 Ω resistor is 0.012 A.

(a) State what is meant by electric current.

.....

..... [1]

(b) The current in the LDR is I_1 and the current in the 800 Ω resistor is I_2.

Complete the equation that relates the current in the 450 Ω resistor to I_1 and I_2.

current in the 450 Ω resistor = ... [1]

(c) Calculate the power dissipated in the 800 Ω resistor.

power = ... [4]

(d) The brightness of the light that is incident on the LDR increases.

Explain what happens to the potential difference (p.d.) across the 450 Ω resistor.

.....

.....

.....

..... [3]

[Total: 9]

42. Nov/2021/Paper_42/No.9

(a) Fig. 9.1 shows a cell of electromotive force (e.m.f.) 1.5 V and a battery of e.m.f. 6.0 V connected in series.

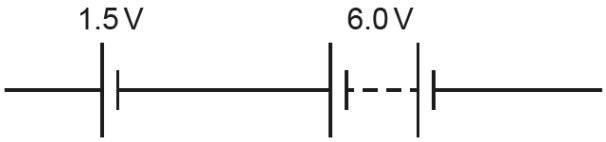


Fig. 9.1

Calculate the combined e.m.f. of the cell and the battery.

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

(b) The combined resistance of the three resistors shown in Fig. 9.2 is 4.4 Ω.

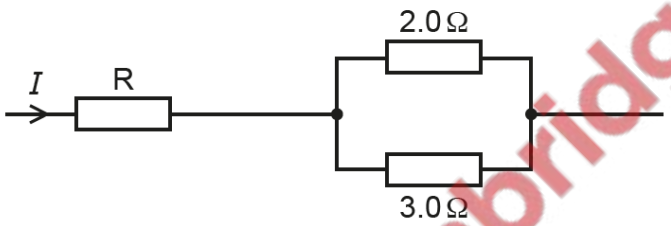


Fig. 9.2

(i) Calculate the resistance of resistor R.

resistance = ... [3]

(ii) The current I in Fig. 9.2 is 0.94 A.

Calculate the potential difference (p.d.) across the combination of resistors.

p.d. = ... [2]

[Total: 6]

43. Nov/2021/Paper_43/No.8

(a) Fig. 8.1 shows two charged metal plates with a gap between them. The plates are parallel to each other. The top plate is negatively charged and the bottom plate is positively charged.

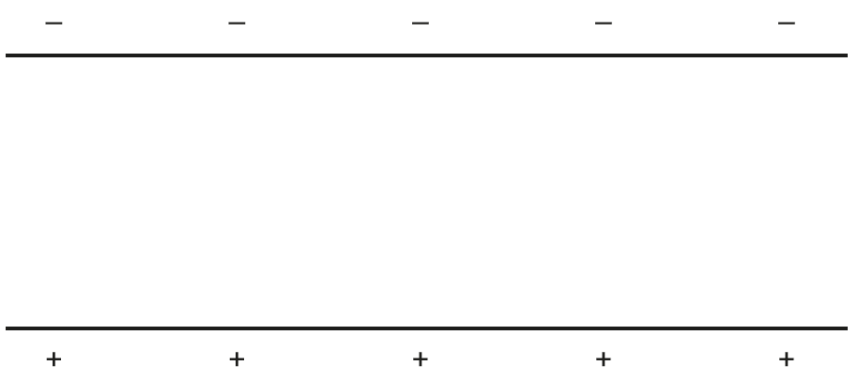


Fig. 8.1

On Fig. 8.1, draw **five** electric field lines between the two plates. [2]

(b) An electric iron has a power of 2400 W. The potential difference (p.d.) of the mains supply is 220 V.

(i) Calculate the electric current in the iron.

current = ... [2]

(ii) Calculate the electric charge which flows through the iron in 15 minutes.

charge = ... [2]

(iii) Fuse ratings of 3A, 5A, 10A, 13A and 30A are available.

State which of these fuse ratings is suitable for use in the iron.

fuse rating ..... [1]

[Total: 7]

44. Nov/2021/Paper_43/No.9

Fig. 9.1 shows current–potential difference (p.d.) graphs for a resistor, a thermistor and a filament lamp.

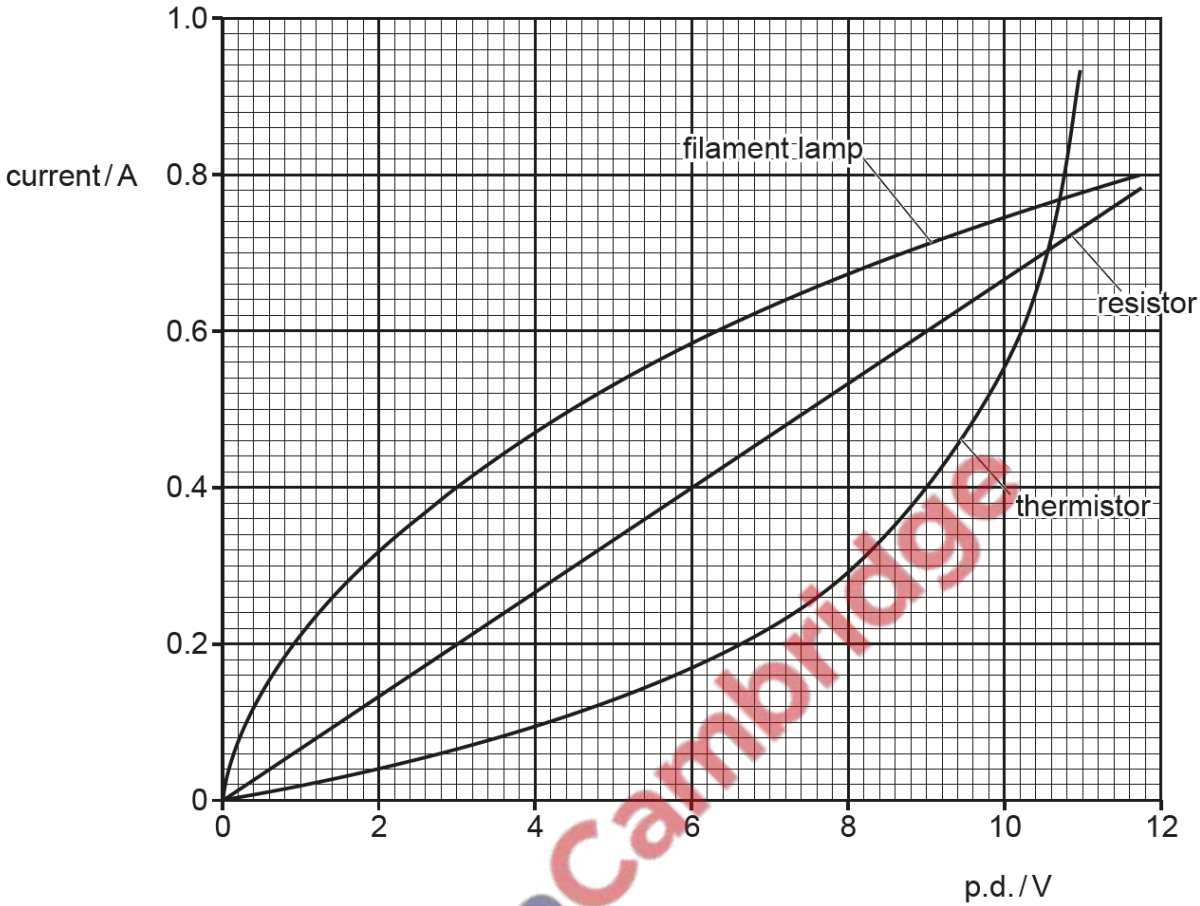


Fig. 9.1

The resistor, the thermistor and the filament lamp are connected in series with a power supply.

(a) (i) Draw a circuit diagram for this circuit.

[2]

(ii) Add a voltmeter to your circuit diagram in **(a)(i)** in a correct position to measure the p.d. across the resistor. [1]

(iii) Using the graph in Fig. 9.1, determine the p.d. across the terminals of the power supply when the p.d. across the resistor is 6.0 V.

p.d. across terminals of power supply = ... [4]

(b) Describe a practical use for a thermistor.

.....

..... [1]

[Total: 8]