Electricity – 2022 November IGCSE 0625

1. Nov/2022/Paper_11/No.25

Which description of a current in a metal is correct?

A a flow of electrons

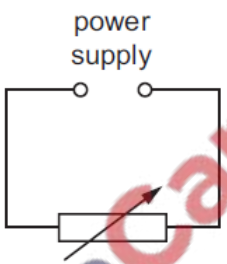
B a flow of molecules

C a flow of positive atoms

D a flow of protons

2. Nov/2022/Paper_11/No.26

The diagram shows a circuit containing a variable resistor connected to a variable power supply.



The table shows the currents for different values of the potential difference (p.d.) and the resistance.

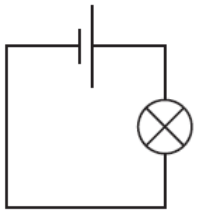
p.d. / V	resistance / Ω	current
3.6	12	I_1
1.2	12	I_2
3.6	6	I_3

What is the order of the currents from smallest to largest?

A $I_1 \rightarrow I_2 \rightarrow I_3$ **B** $I_1 \rightarrow I_3 \rightarrow I_2$ **C** $I_2 \rightarrow I_1 \rightarrow I_3$ **D** $I_3 \rightarrow I_1 \rightarrow I_2$

3. Nov/2022/Paper_11/No.27

The e.m.f. of the cell in this circuit is 1.5 V.



What does e.m.f. stand for?

A electromagnetic field

B electromagnetic force

C electromotive field

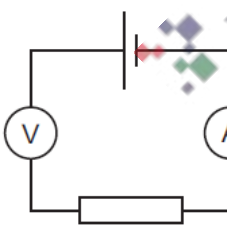
D electromotive force

4. Nov/2022/Paper_11/No.29

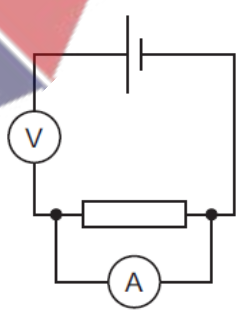
A student finds the resistance of a resistor.

Which circuit is used to measure the potential difference (p.d.) across the resistor and the current in it?

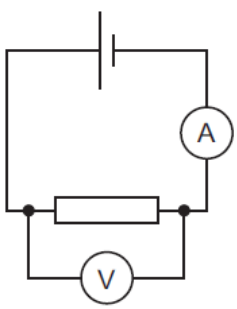
A



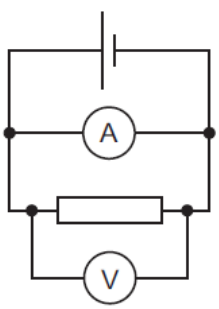
B



C

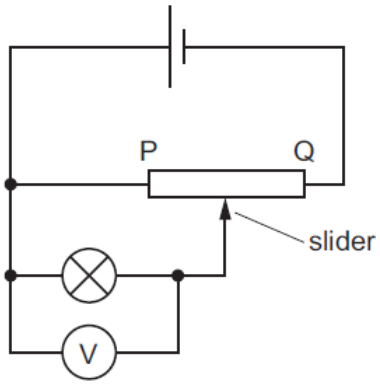


D



5. Nov/2022/Paper_11/No.30

The circuit diagram shows a variable potential divider.



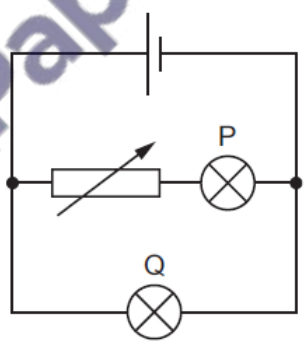
The slider is moved from P towards Q.

What happens to the reading on the voltmeter and to the brightness of the lamp?

	reading on voltmeter	brightness of lamp
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

6. Nov/2022/Paper_11/No.31

The diagram shows a circuit containing a cell, a variable resistor and two bulbs, P and Q.



The resistance of the variable resistor is increased.

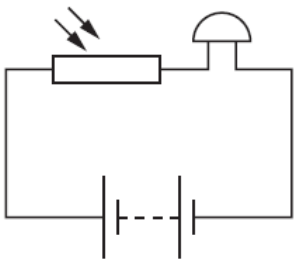
What happens to the brightness of each bulb?

	brightness of bulb P	brightness of bulb Q
A	dimmer	dimmer
B	dimmer	remains the same
C	remains the same	dimmer
D	remains the same	remains the same

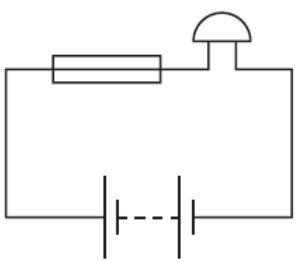
7. Nov/2022/Paper_11/No.32

Which diagram shows a circuit containing a battery, a fuse and a buzzer?

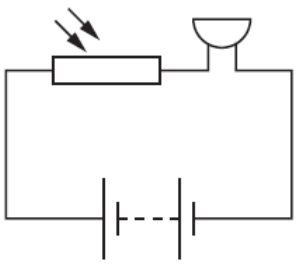
A



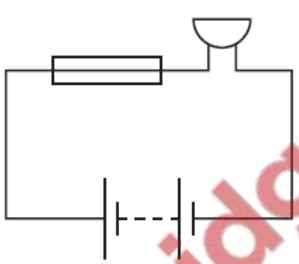
B



C



D



8. Nov/2022/Paper_11/No.33

Why is a fuse used in an electric circuit?

A to increase the circuit resistance

B to prevent short circuits

C to reduce the power loss

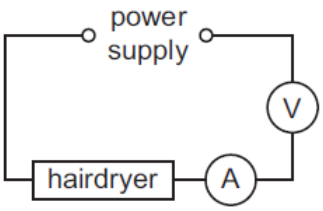
D to stop the cables from overheating

9. Nov/2022/Paper_12/No.25

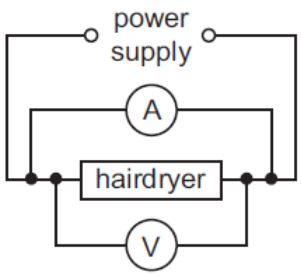
An electric hairdryer is rated 230 V, 2 A.

Which circuit could be used to check that these ratings are correct?

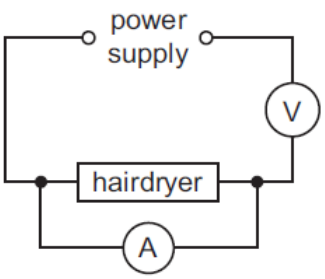
A



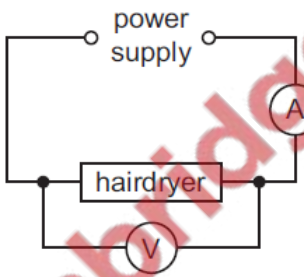
B



C



D

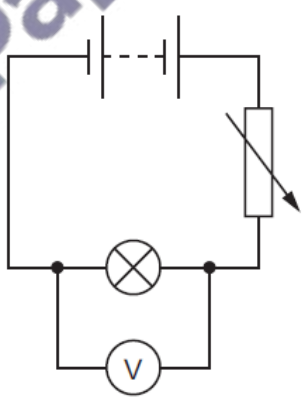


10. Nov/2022/Paper_12/No.26

The diagram shows a circuit used to control the potential difference (p.d.) across a lamp.

The variable resistor is adjusted until the p.d. across the lamp is 6.0 V.

The current in the lamp is 0.5 A.



What is the resistance of the lamp?

A 0.083 Ω **B** 3.0 Ω **C** 6.5 Ω **D** 12.0 Ω

11. Nov/2022/Paper_12/No.27

What are the units of electromotive force (e.m.f.)?

A amperes

B watts

C ohms

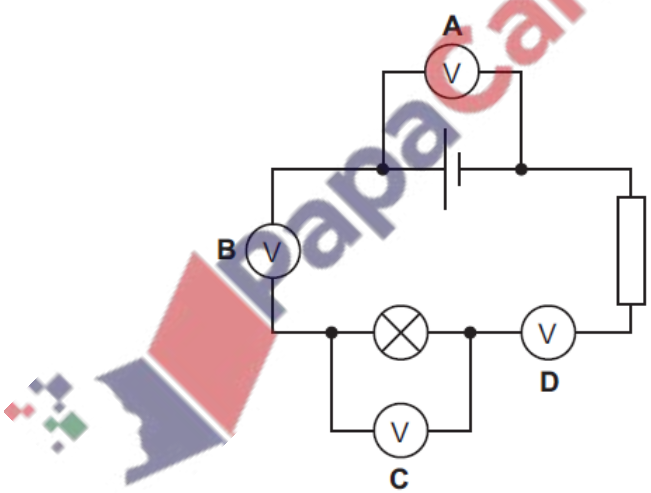
D volts

12. Nov/2022/Paper_12/No.29

A circuit containing a cell, a resistor and a lamp is set up as shown.

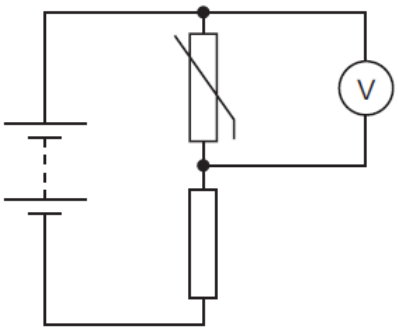
A student connects a voltmeter to the circuit in one of the positions shown.

In which position does the voltmeter measure the potential difference (p.d.) across the lamp?



13. Nov/2022/Paper_12/No.30

The diagram shows a potential divider circuit.



The temperature of the thermistor increases.

What happens to the resistance of the thermistor, and what happens to the reading on the voltmeter?

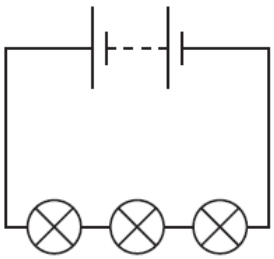
	resistance of thermistor	voltmeter reading
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

14. Nov/2022/Paper_12/No.31

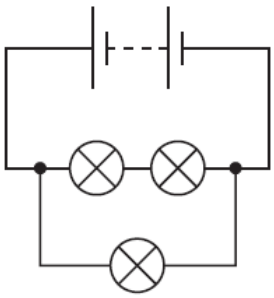
A student sets up four circuits using identical batteries and three identical lamps.

In which circuit will all the lamps be the brightest?

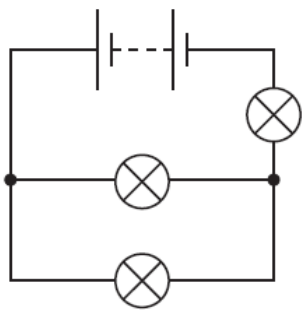
A



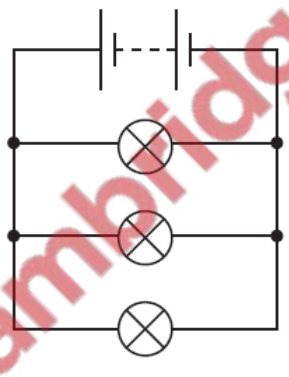
B



C



D

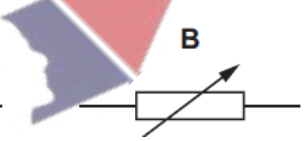


15. Nov/2022/Paper_12/No.32

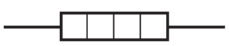
Which diagram shows the circuit symbol for a fuse?

A

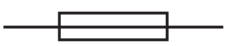
B



C



D



16. Nov/2022/Paper_12/No.33

If the insulation within a mains cable becomes damaged, two of the wires in it may touch and cause a short circuit.

Which row is correct?

	the danger when this happens	safety device which avoids this danger
A	a large current will overheat the wiring and lead to a fire	a fuse
B	a large current will overheat the wiring and lead to a fire	a relay
C	the appliance at the end of the cable will be damaged	a fuse
D	the appliance at the end of the cable will be damaged	a relay

17. Nov/2022/Paper_13/No.25

Copper wires are used to connect an electric circuit.

Which particles flow in the wires when the circuit is switched on?

A atoms

B electrons

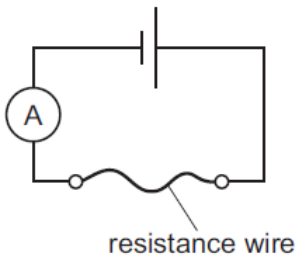
C ions

D neutrons

18. Nov/2022/Paper_13/No.26

A student is investigating a resistance wire.

She measures the current in a 50 cm length of resistance wire.



The student repeats the experiment using a 100 cm length of the same resistance wire.

What is the effect of this change on the current in the circuit and on the resistance of the wire?

	effect on current	effect on resistance
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

19. Nov/2022/Paper_13/No.27

What is the full name of the term e.m.f.?

A electromotive field

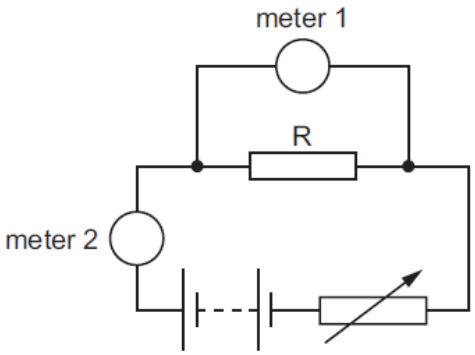
B electromotive force

C electromotive frequency

D electromotive friction

20. Nov/2022/Paper_13/No.29

The diagram shows the circuit that a student uses to determine the resistance of resistor R.

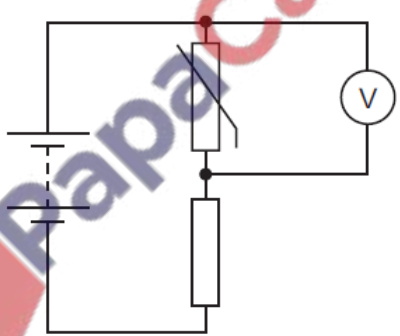


Which row describes meter 1 and meter 2?

	meter 1	meter 2
A	ammeter	ammeter
B	ammeter	voltmeter
C	voltmeter	ammeter
D	voltmeter	voltmeter

21. Nov/2022/Paper_13/No.30

The diagram shows a potential divider circuit.



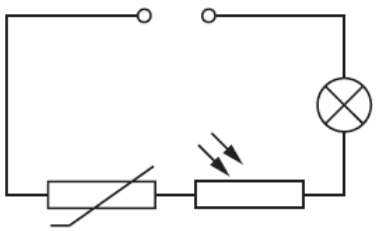
The temperature of the thermistor increases.

What happens to the resistance of the thermistor, and what happens to the reading on the voltmeter?

	resistance of thermistor	voltmeter reading
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

22. Nov/2022/Paper_13/No.31

The diagram shows a series circuit containing a fixed voltage power supply, a thermistor, a light-dependent resistor (LDR) and a lamp.

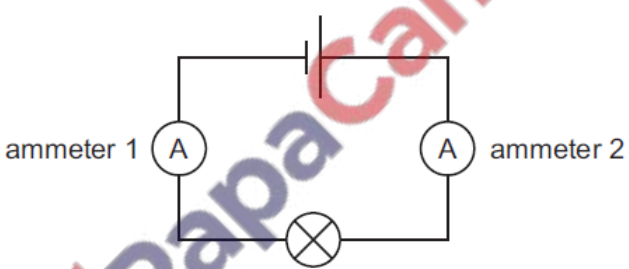


Which set of conditions makes the lamp brightest?

	light intensity shining on LDR	temperature of thermistor
A	bright	high
B	bright	low
C	dim	high
D	dim	low

23. Nov/2022/Paper_13/No.32

The diagram shows a circuit containing a cell, a lamp and two ammeters.



The current reading on ammeter 2 is 0.20 A.

What is the name for this type of circuit and what is the reading on ammeter 1?

	type of circuit	reading on ammeter 1
A	series	0.20 A
B	series	greater than 0.20 A
C	parallel	0.20 A
D	parallel	greater than 0.20 A

24. Nov/2022/Paper_13/No.33

The circuit connecting a room heater to the mains electricity supply has a fuse in it.

The fuse melts and switches off the circuit.

Why does the wire in the fuse melt?

A The air in the room becomes too damp.

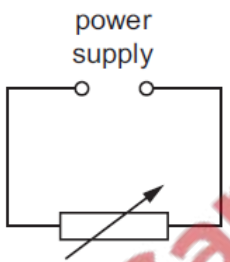
B The air in the room reaches its required temperature.

C The insulation around the circuit wire becomes damaged.

D The current in the circuit becomes too large.

25. Nov/2022/Paper_21/No.26

The diagram shows a circuit containing a variable resistor connected to a variable power supply.



The table shows the currents for different values of the potential difference (p.d.) and the resistance.

p.d. / V	resistance / Ω	current
3.6	12	I_1
1.2	12	I_2
3.6	6	I_3

What is the order of the currents from smallest to largest?

A $I_1 \rightarrow I_2 \rightarrow I_3$ **B** $I_1 \rightarrow I_3 \rightarrow I_2$ **C** $I_2 \rightarrow I_1 \rightarrow I_3$ **D** $I_3 \rightarrow I_1 \rightarrow I_2$

26. Nov/2022/Paper_21/No.29

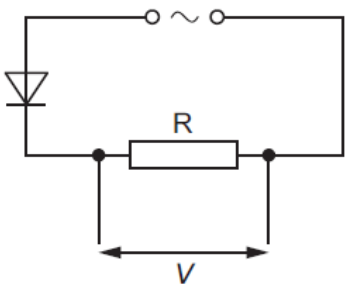
A lamp rated 12 V, 2.0 A is switched on for one minute.

How much energy is transferred by the lamp?

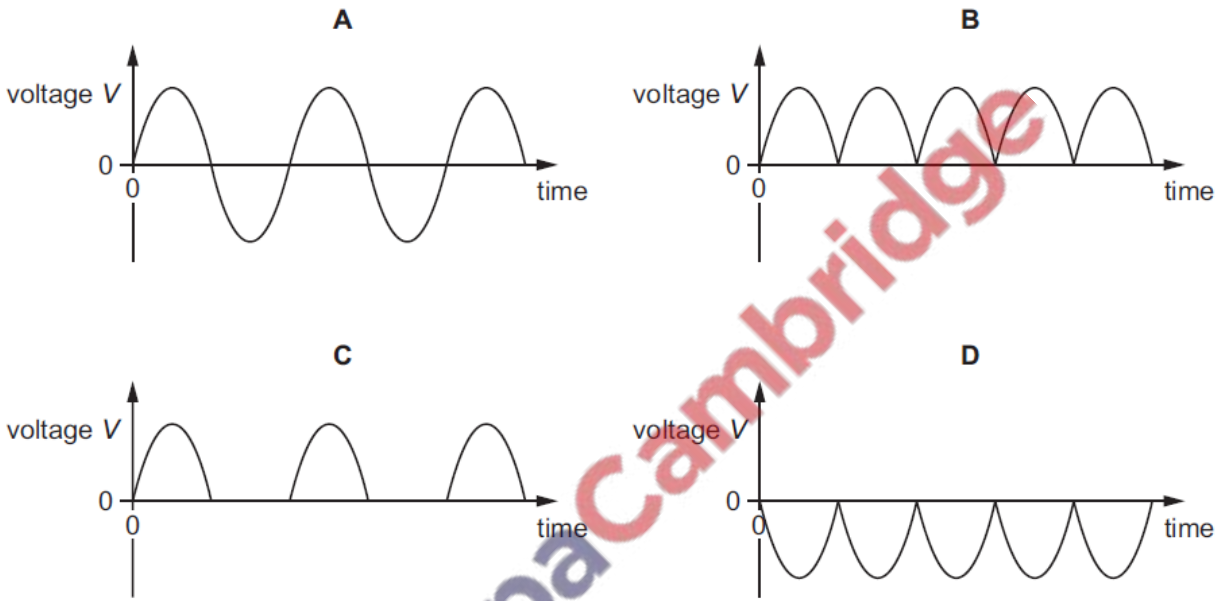
A 6.0 J **B** 24 J **C** 360 J **D** 1440 J

27. Nov/2022/Paper_21/No.30

An alternating current (a.c.) power supply is connected in series with a resistor R and a diode.



Which graph shows how the voltage *V* across the resistor R varies with time?



28. Nov/2022/Paper_21/No.31

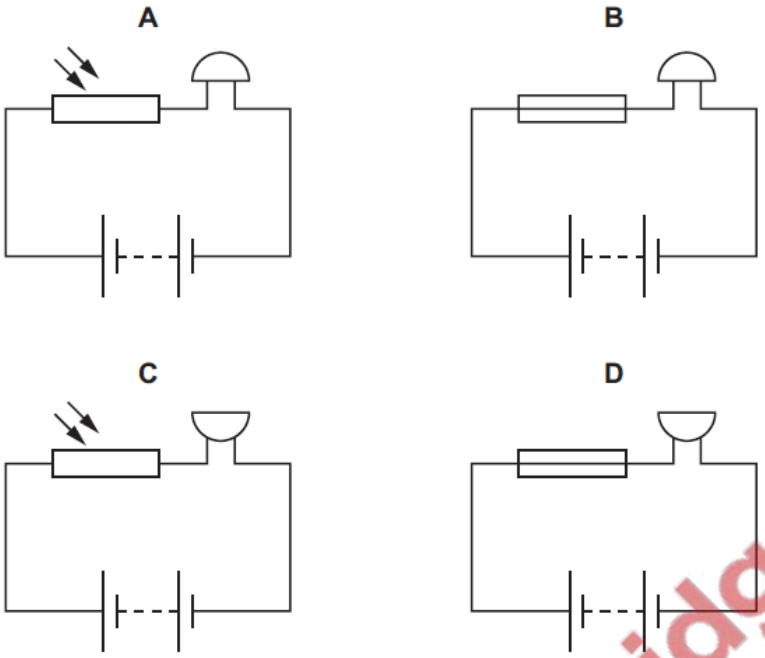
A student makes four resistors using different pieces of wire. The wires have different diameters and lengths. All the pieces of wire are made of the same material.

Which piece of wire will make the resistor with the largest resistance?

	diameter / mm	length / cm
A	0.8	10
B	0.8	17
C	2.0	10
D	2.0	17

29. Nov/2022/Paper_21/No.32

Which diagram shows a circuit containing a battery, a fuse and a buzzer?

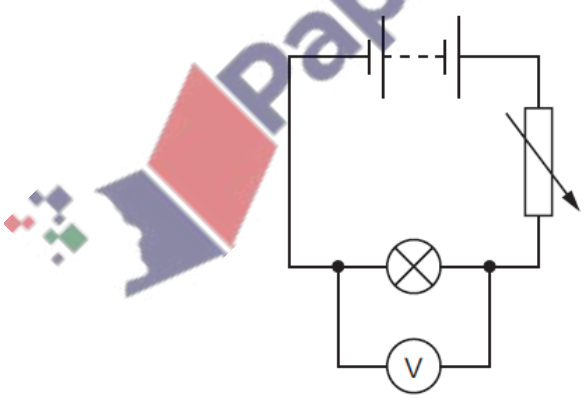


30. Nov/2022/Paper_22/No.26

The diagram shows a circuit used to control the potential difference (p.d.) across a lamp.

The variable resistor is adjusted until the p.d. across the lamp is 6.0 V.

The current in the lamp is 0.5 A.



What is the resistance of the lamp?

A 0.083 Ω **B** 3.0 Ω **C** 6.5 Ω **D** 12.0 Ω

31. Nov/2022/Paper_22/No.27

A charge Q flows for time t through a resistor of resistance R.

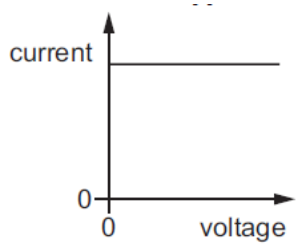
Which equation gives the current I in the resistor?

A $I = Qt$ **B** $I = Rt$ **C** $I = \frac{Q}{t}$ **D** $I = \frac{R}{t}$

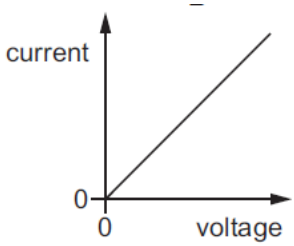
32. Nov/2022/Paper_22/No.29

Which diagram shows a graph of current against voltage for a filament lamp?

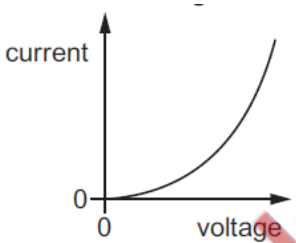
A



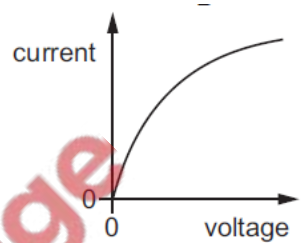
B



C



D



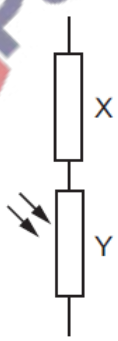
33. Nov/2022/Paper_22/No.30

Each potential divider is placed in a circuit with a power supply.

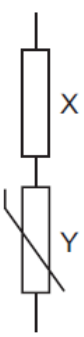
Which potential divider makes the potential difference (p.d.) across component Y increase when the light intensity increases?

A

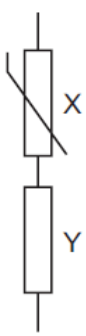
B



C



D



34. Nov/2022/Paper_22/No.31

Diagram 1 is a circuit diagram showing an a.c. power supply connected to four diodes and a resistor.

Diagram 2 shows the output voltage from the power supply.

diagram 1

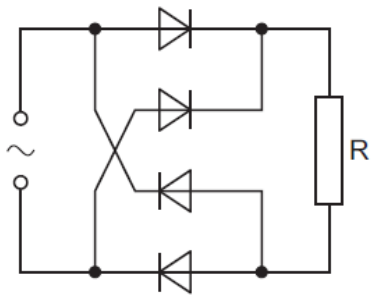
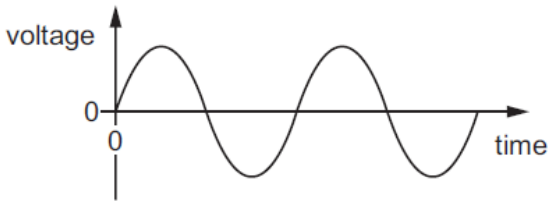
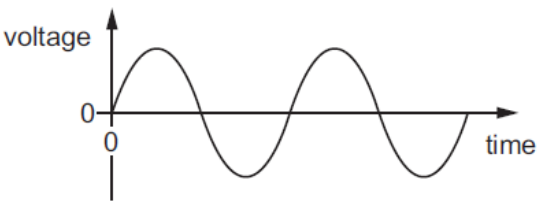


diagram 2

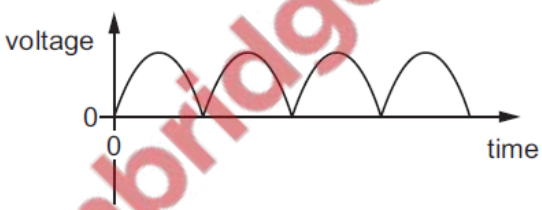


Which graph correctly shows the voltage–time curve across resistor R?

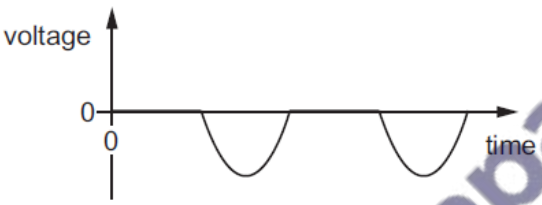
A



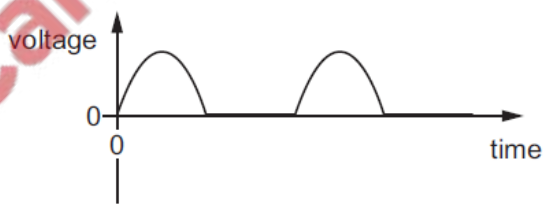
B



C



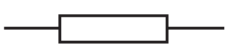
D



35. Nov/2022/Paper_22/No.32

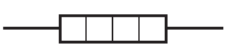
Which diagram shows the circuit symbol for a fuse?

A

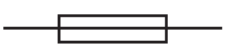


B

C



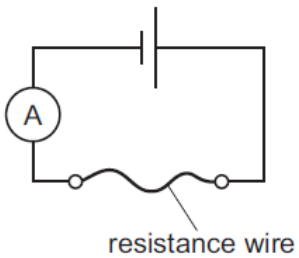
D



36. Nov/2022/Paper_23/No.26

A student is investigating a resistance wire.

She measures the current in a 50 cm length of resistance wire.



The student repeats the experiment using a 100 cm length of the same resistance wire.

What is the effect of this change on the current in the circuit and on the resistance of the wire?

	effect on current	effect on resistance
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

37. Nov/2022/Paper_23/No.27

A resistor is connected to a cell so that there is a current from the positive terminal of the cell to the negative terminal.

What causes the current in the resistor?

A electrons moving from the negative terminal of the cell to the positive terminal

B electrons moving from the positive terminal of the cell to the negative terminal

C protons moving from the negative terminal of the cell to the positive terminal

D protons moving from the positive terminal of the cell to the negative terminal

38. Nov/2022/Paper_23/No.29

Which combination of the current in a resistor and the time for which it is present results in a charge of 240 C passing through the resistor?

A a current of 2.0 A for 120 s

B a current of 4.0 A for 960 s

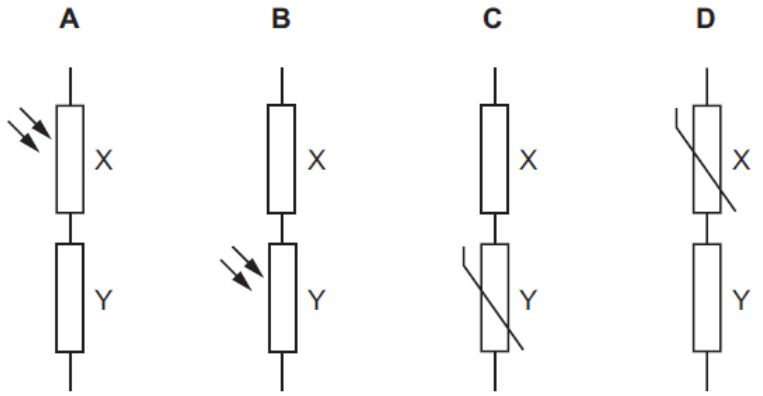
C a current of 6.0 A for 40 minutes

D a current of 8.0 A for 30 minutes

39. Nov/2022/Paper_23/No.30

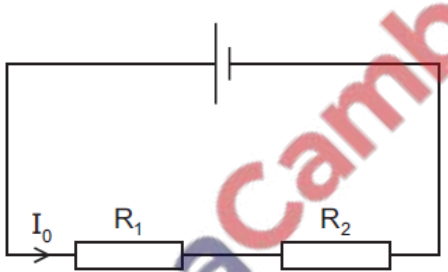
Each potential divider is placed in a circuit with a power supply.

Which potential divider makes the potential difference (p.d.) across component Y increase when the light intensity increases?



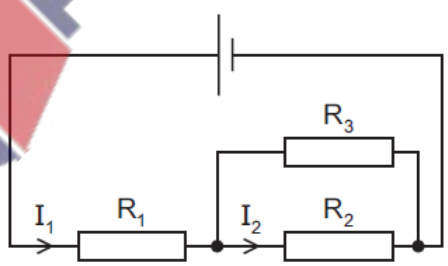
40. Nov/2022/Paper_23/No.31

Two resistors, R_1 and R_2, are connected in series in a circuit, as shown.



The current in the resistors is I_0.

Another resistor, R_3, is then connected in parallel with R_2, as shown.

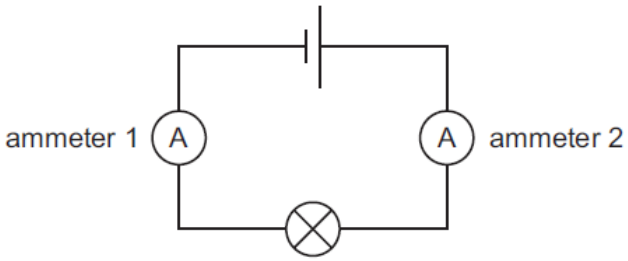


How do the currents I_1 and I_2 in the resistors R_1 and R_2 compare to current I_0?

	current in R_1	current in R_2
A	$I_1 = I_0$	$I_2 < I_0$
B	$I_1 = I_0$	$I_2 = I_0$
C	$I_1 > I_0$	$I_2 = I_0$
D	$I_1 > I_0$	$I_2 < I_0$

41. Nov/2022/Paper_23/No.32

The diagram shows a circuit containing a cell, a lamp and two ammeters.



The current reading on ammeter 2 is 0.20 A.

What is the name for this type of circuit and what is the reading on ammeter 1?

	type of circuit	reading on ammeter 1
A	series	0.20 A
B	series	greater than 0.20 A
C	parallel	0.20 A
D	parallel	greater than 0.20 A

42. Nov/2022/Paper_31/No.8

Fig. 8.1 shows an electric circuit set up by a student.

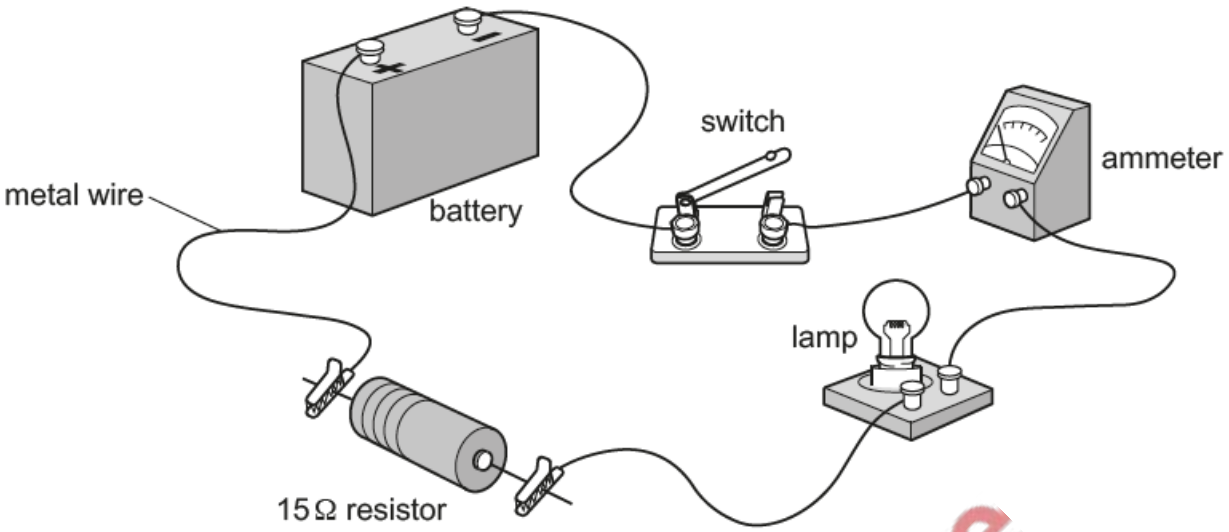


Fig. 8.1

(a) Using standard symbols, draw a circuit diagram for the student's circuit.

[4]

(b) When the switch is closed there is a current in the circuit.

State the name of the particles flowing in the metal wire.

..... [1]

(c) The current in the 15 Ω resistor in Fig. 8.1 is 0.40 A when the switch is closed.

Calculate the potential difference (p.d.) across the 15 Ω resistor.

p.d. across resistor = ... V [3]

[Total: 8]

43. Nov/2022/Paper_32/No.8

A student uses the circuit in Fig. 8.1 to find the resistance of a piece of iron wire.

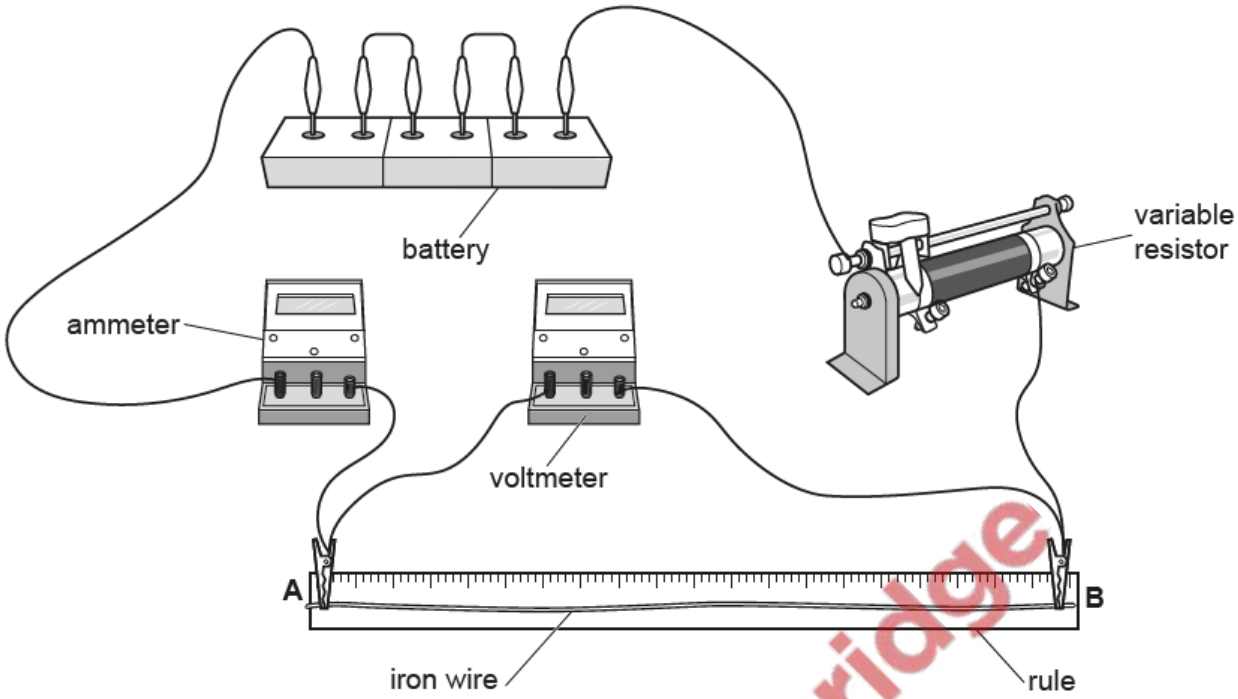
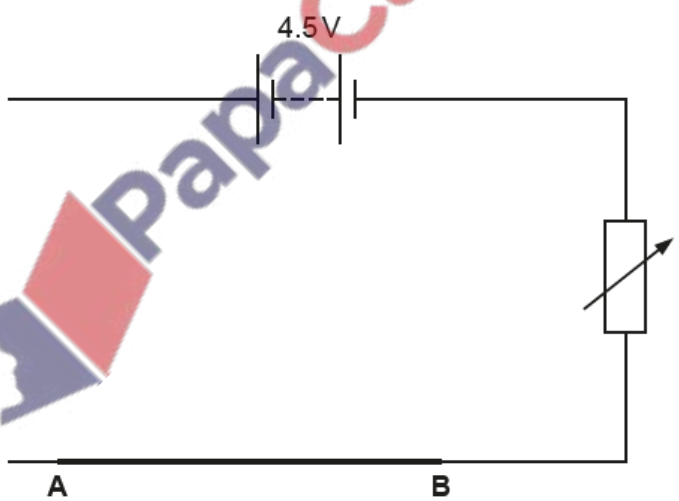


Fig. 8.1

(a) Complete Fig. 8.2 to show the circuit diagram for the arrangement shown in Fig. 8.1.

The piece of iron wire is shown as the thicker line between the points A and B.



[3]

Fig. 8.2

(b) The reading on the voltmeter is 1.56 V.

The reading on the ammeter is 0.112 A.

Calculate the resistance of the iron wire. Include the unit in your answer.

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

[Total: 7]

44. Nov/2022/Paper_32/No.9(d_ e)

(d) Using the information in Fig. 9.1, calculate the reading on the voltmeter.

reading on voltmeter = ... V [3]

(e) The 10 V a.c. power supply is replaced by a 10 V d.c. battery.

State the reading on the voltmeter.

reading on voltmeter = ... V [1]

45. Nov/2022/Paper_33/No.9

(a) Fig. 9.1 shows a hazardous scenario of using electricity in a kitchen.

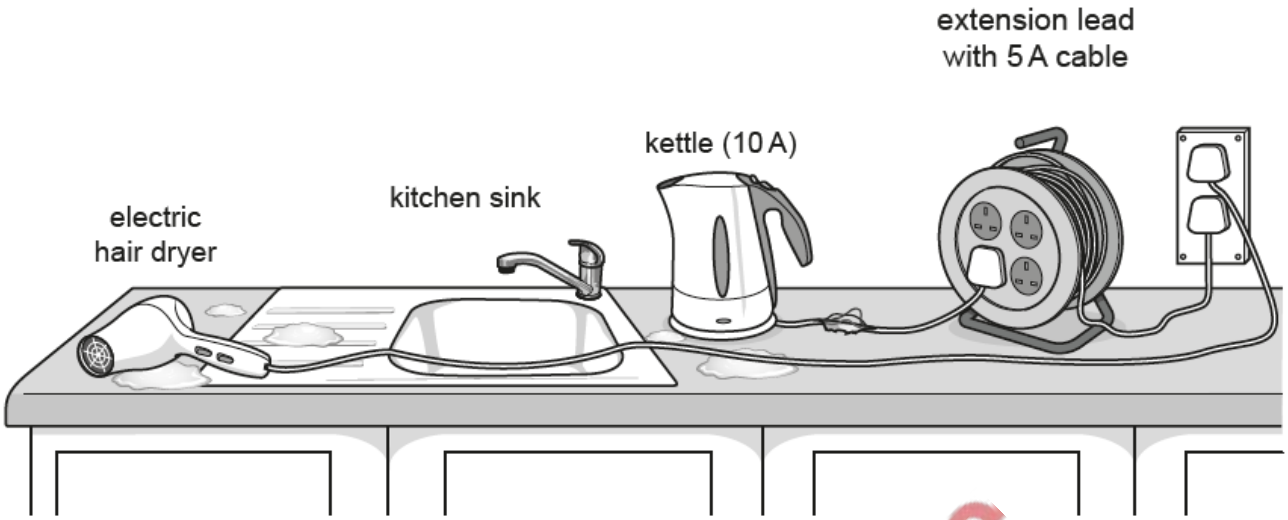


Fig. 9.1

(i) Identify **three** electrical hazards in Fig. 9.1.

1. .....

2. .....

3. .....

[3]

(ii) Give **two** possible consequences of the electrical hazards in Fig. 9.1.

1. .....

.....

2. .....

.....

[2]

(b) Fig. 9.2 shows the circuit for a hair dryer.

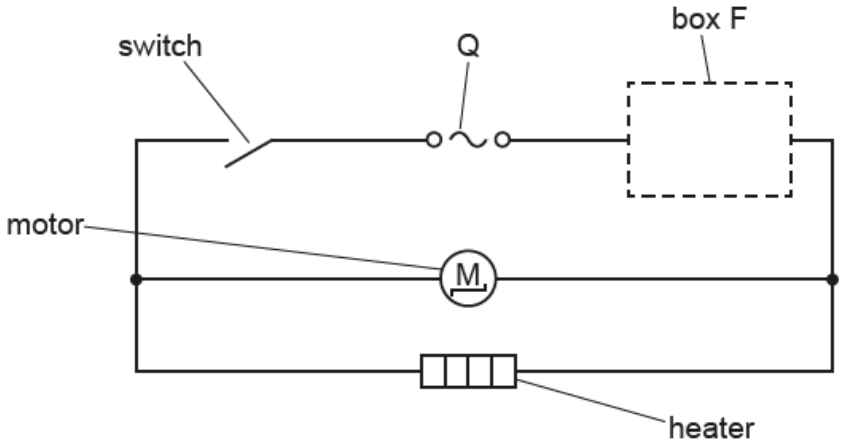


Fig. 9.2

(i) State the name of the component labelled Q in Fig. 9.2. ..... [1]

(ii) On Fig. 9.2, in the dashed box F, draw the circuit symbol for a fuse. [1]

(iii) State the purpose of a fuse.

..... [1]

(iv) State an advantage of using a circuit breaker instead of a fuse.

..... [1]

(c) A different hair dryer has a fuse and two heat settings.

When the hair dryer is used on the low heat setting, the current in the hair dryer is 5.2 A.
When the hair dryer is used on the high heat setting, the current in the hair dryer is 8.9 A.

Circle **one** correct fuse rating for this hair dryer.

5 A **10 A** **13 A** **15 A** **30 A** [1]

[Total: 10]

46. Nov/2022/Paper_41/No.8

The unit of the two electrical quantities electromotive force (e.m.f.) and potential difference (p.d.) is the volt (V).

(a) State **one** other similarity between e.m.f. and p.d.

.....

..... [1]

(b) State **one** difference between e.m.f. and p.d.

.....

..... [1]

(c) A battery consists of four cells, each of e.m.f. 1.2 V, in series.

(i) Calculate the e.m.f. of the battery.

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

(ii) The battery is connected in a circuit with four 12 Ω resistors. Fig. 8.1 is the circuit diagram.

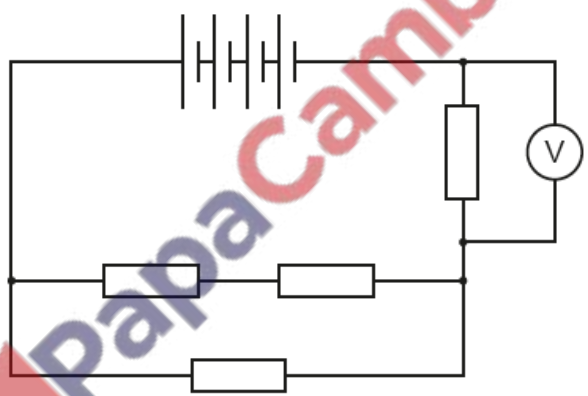


Fig. 8.1

Calculate the total resistance of this arrangement of resistors.

resistance = ... [3]

(iii) Calculate the reading on the voltmeter in Fig. 8.1.

reading = ... [2]

[Total: 8]

47. Nov/2022/Paper_42/No.8

Fig. 8.1 shows an electrical circuit.

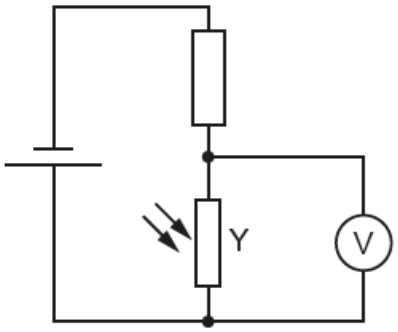


Fig. 8.1

(a) The light intensity at the circuit increases from dark to bright.

State any effect on the resistance of component Y.

.....

State and explain any effect on the reading of the voltmeter.

.....

.....

[3]

(b) The circuit shown in Fig. 8.2 is switched on for 2.0 min.

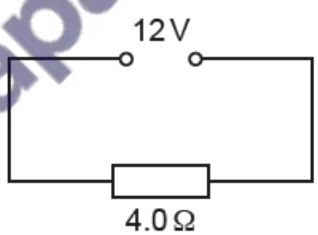


Fig. 8.2

The current in the 4.0 Ω resistor is 3.0 A and the magnitude of the charge on an electron is 1.6×10^{-19} C.

(i) Calculate the number of electrons that pass through the resistor each second.

number = ... [3]

(ii) Calculate the power dissipated by the resistor.

power = ... [2]

[Total: 8]

48. Nov/2022/Paper_43/No.8(b)

(b) Fig. 8.2 shows an electric circuit.

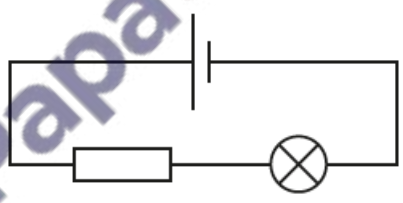


Fig. 8.2

On Fig. 8.2, draw an arrow to show the direction of flow of electrons and explain how you determined the direction.

explanation ..... [1]