Electricity – 2020 IGCSE 0625

1. Nov/2020/Paper_11/No.29

What is an electric current in a metal wire?

A a flow of electrons

B a flow of neutrons

C a flow of nucleons

D a flow of protons

2. Nov/2020/Paper_11/No.30

Four wires are made of the same metal.

Which wire has the greatest resistance?

A a 100 cm long wire with a diameter of 3.0 mm

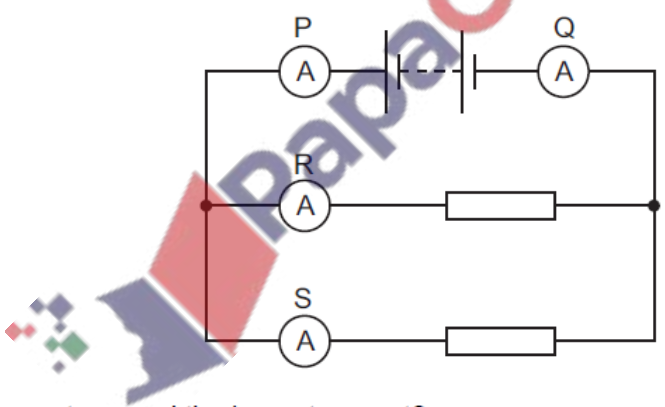
B a 100 cm long wire with a diameter of 6.0 mm

C a 10 cm long wire with a diameter of 3.0 mm

D a 10 cm long wire with a diameter of 6.0 mm

3. Nov/2020/Paper_11/No.31

A student uses four ammeters P, Q, R and S to measure the current in different parts of the circuit shown.

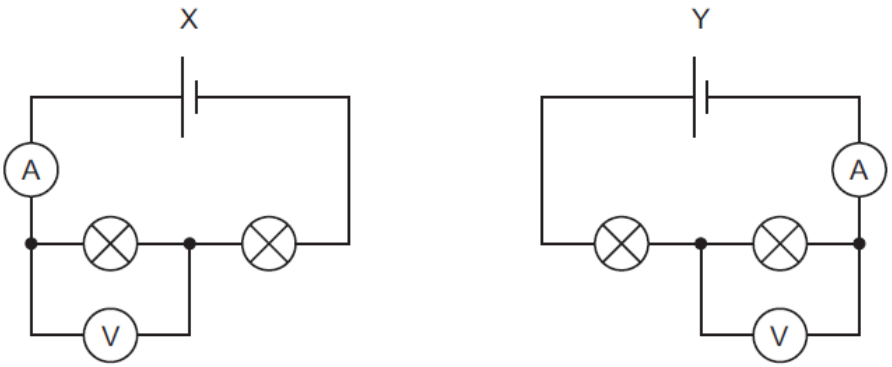


Which two ammeters read the largest current?

A P and Q **B** P and R **C** R and Q **D** R and S

4. Nov/2020/Paper_11/No.32

A circuit X is set up with two identical lamps. Circuit Y is then set up, changing the positions of the meters.



On which meters do the readings change?

A both the ammeter and the voltmeter

B the ammeter only

C the voltmeter only

D neither the ammeter nor the voltmeter

5. Nov/2020/Paper_12/No.30

There is a current in a variable resistor when a potential difference (p.d.) is applied across it.

In which situation is the current increased?

A Decrease the p.d. and keep the resistance the same.

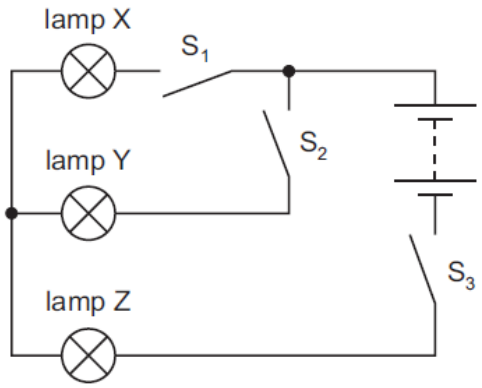
B Decrease the p.d. and increase the resistance.

C Keep the p.d. the same and decrease the resistance.

D Keep the p.d. the same and increase the resistance.

6. Nov/2020/Paper_12/No.31

The circuit shown includes a battery, three lamps X, Y and Z and three switches S_1, S_2 and S_3.



Lamp X is off but lamps Y and Z are lit.

Which switches are closed?

A S_1 and S_2 only

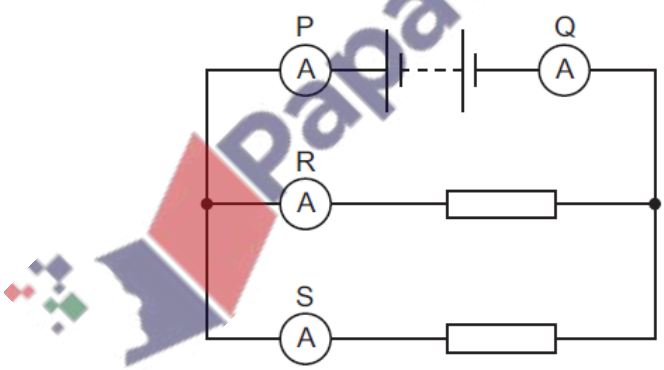
B S_1 and S_3 only

C S_2 and S_3 only

D S_1, S_2 and S_3

7. Nov/2020/Paper_12/No.32

A student uses four ammeters P, Q, R and S to measure the current in different parts of the circuit shown.



Which two ammeters read the largest current?

A P and Q **B** P and R **C** R and Q **D** R and S

8. Nov/2020/Paper_12/No.33

An electrical appliance is powered from a mains supply.

The appliance normally uses a current of 3 A, but the current briefly rises to 4 A at the instant the appliance is switched on. The cable to the appliance is designed for currents up to 6 A.

A fuse is used to protect the circuit.

What should be the rating of the fuse?

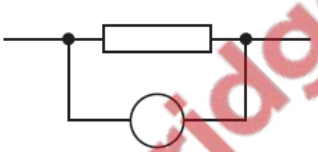
A 1 A **B** 3 A **C** 5 A **D** 13 A

9. Nov/2020/Paper_13/No.30

Each diagram shows part of a circuit. The circle represents an instrument used to measure the potential difference (p.d.) across the resistor.

diagram 1

diagram 2

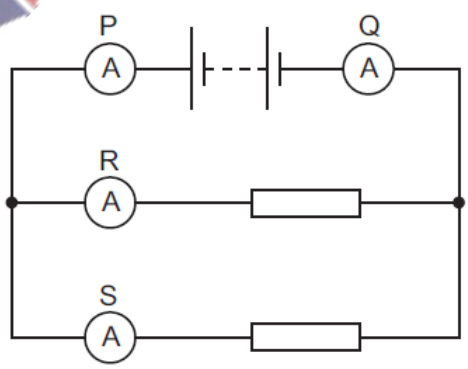


Which row is correct?

	the unit of p.d.	diagram which shows the meter correctly connected
A	amperes	diagram 1
B	amperes	diagram 2
C	volts	diagram 1
D	volts	diagram 2

10. Nov/2020/Paper_13/No.31

A student uses four ammeters P, Q, R and S to measure the current in different parts of the circuit shown.



Which two ammeters read the largest current?

A P and Q **B** P and R **C** R and Q **D** R and S

11. Nov/2020/Paper_13/No.32

Three statements about a relay are given.

1 A relay has a coil that becomes a temporary magnet when in operation.

2 A large current in a relay coil is used to switch off a smaller current.

3 A small current in a relay coil is used to switch on a larger current.

Which statements are correct?

A 1 and 2 only **B** 2 and 3 only **C** 1 and 3 only **D** 1, 2 and 3

12. Nov/2020/Paper_13/No.33

An electrical appliance is powered from a mains supply.

The appliance normally uses a current of 3 A, but the current briefly rises to 4 A at the instant the appliance is switched on. The cable to the appliance is designed for currents up to 6 A.

A fuse is used to protect the circuit.

What should be the rating of the fuse?

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

13. Nov/2020/Paper_11/No.33

An electrical appliance is powered from a mains supply.

The appliance normally uses a current of 3 A, but the current briefly rises to 4 A at the instant the appliance is switched on. The cable to the appliance is designed for currents up to 6 A.

A fuse is used to protect the circuit.

What should be the rating of the fuse?

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

14. Nov/2020/Paper_21/No.30

Which statement defines the electromotive force (e.m.f.) of a cell?

A the current in the cell when 1.0 C of charge flows in 1.0 s

B the current supplied by the cell to drive 1.0 C of charge around a complete circuit

C the energy supplied by the cell to drive 1.0 C of charge around a complete circuit

D the energy supplied by the cell to drive 1.0 A of current around a complete circuit

15. Nov/2020/Paper_21/No.31

Four wires are made of the same metal.

Which wire has the greatest resistance?

A a 100 cm long wire with a diameter of 3.0 mm

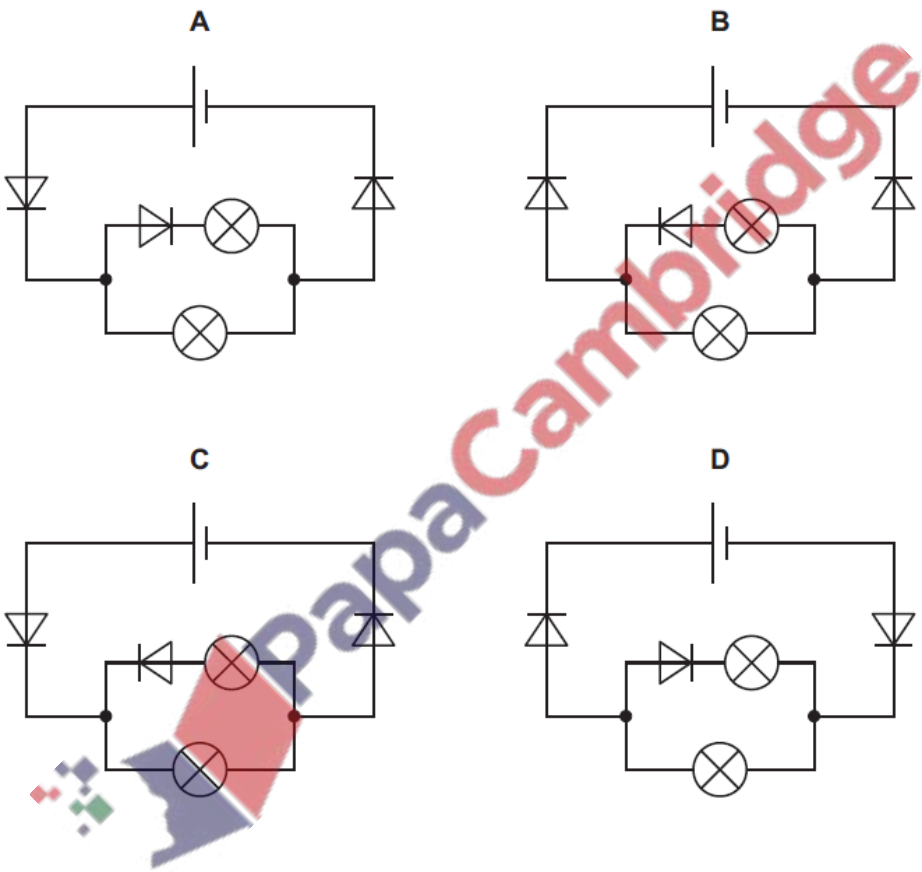
B a 100 cm long wire with a diameter of 6.0 mm

C a 10 cm long wire with a diameter of 3.0 mm

D a 10 cm long wire with a diameter of 6.0 mm

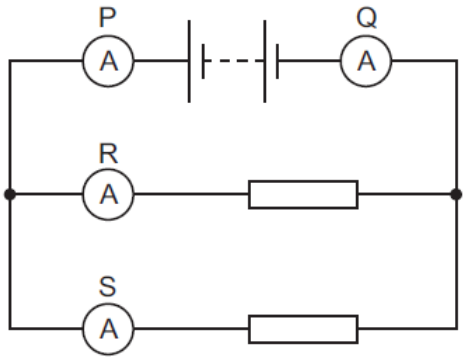
16. Nov/2020/Paper_21/No.32

In which circuit is there just a single lamp lit?



17. Nov/2020/Paper_21/No.33

A student uses four ammeters P, Q, R and S to measure the current in different parts of the circuit shown.



Which two ammeters read the largest current?

A P and Q **B** P and R **C** R and Q **D** R and S

18. Nov/2020/Paper_22/No.30

Which quantity is defined as the energy transferred by a cell in driving unit charge around a complete circuit?

A current

B electromotive force (e.m.f.)

C power

D resistance

19. Nov/2020/Paper_22/No.31

There is a current in a variable resistor when a potential difference (p.d.) is applied across it.

In which situation is the current increased?

A Decrease the p.d. and keep the resistance the same.

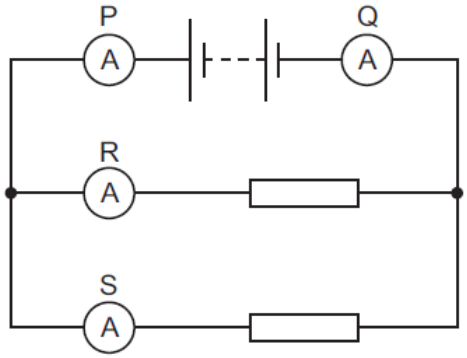
B Decrease the p.d. and increase the resistance.

C Keep the p.d. the same and decrease the resistance.

D Keep the p.d. the same and increase the resistance.

20. Nov/2020/Paper_22/No.32

A student uses four ammeters P, Q, R and S to measure the current in different parts of the circuit shown.



Which two ammeters read the largest current?

A P and Q **B** P and R **C** R and Q **D** R and S

21. Nov/2020/Paper_23/No.30

Electromotive force (e.m.f.) is defined in terms of the energy supplied in driving which physical quantity around a complete circuit?

A charge

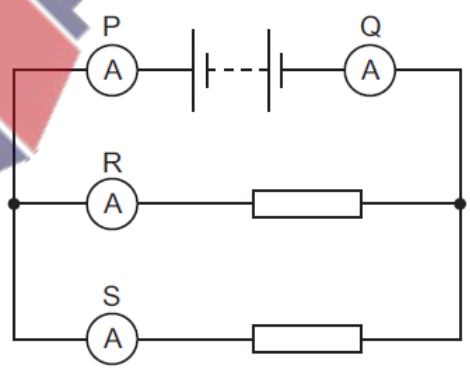
B current

C potential difference (p.d.)

D power

22. Nov/2020/Paper_23/No.31

A student uses four ammeters P, Q, R and S to measure the current in different parts of the circuit shown.



Which two ammeters read the largest current?

A P and Q **B** P and R **C** R and Q **D** R and S

23. Nov/2020/Paper_23/No.32

Three statements about a relay are given.

1 A relay has a coil that becomes a temporary magnet when in operation.

2 A large current in a relay coil is used to switch off a smaller current.

3 A small current in a relay coil is used to switch on a larger current.

Which statements are correct?

A 1 and 2 only **B** 2 and 3 only **C** 1 and 3 only **D** 1, 2 and 3

24. Nov/2020/Paper_31/No.10

A student determines the resistance of a piece of metal wire XY.
Fig. 10.1 shows the wire connected in the circuit.

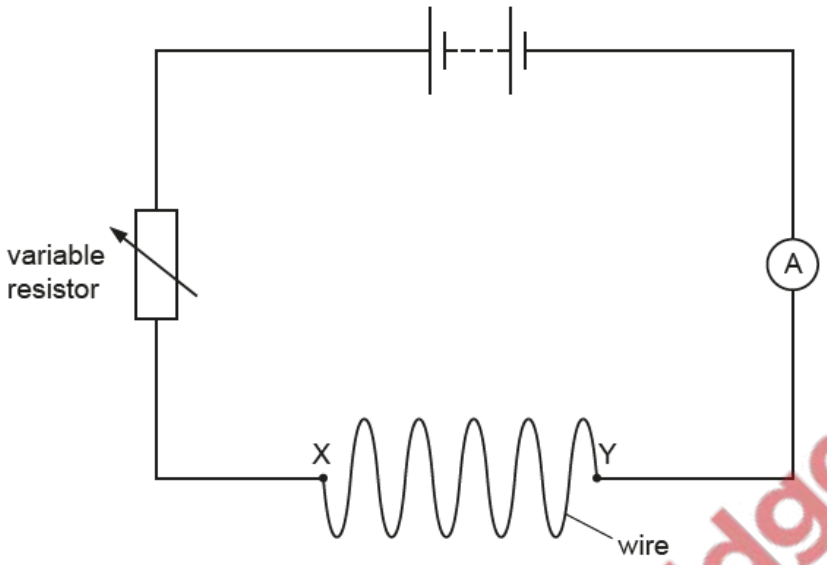


Fig. 10.1

(a) (i) The student measures the potential difference (p.d.) across the wire XY.
On Fig. 10.1, show the voltmeter correctly connected. Use the correct symbol. [1]

(ii) There is a current in the wire. State the name of the particles that flow through the wire.

..... [1]

(iii) The student removes wire XY and replaces it with another wire CD. Wire CD is the same length and is made of the same material as wire XY, but thinner.

State any difference between the current in wire CD and the current in wire XY. Explain your answer.

.....

.....

..... [2]

(iv) State the unit used for the electromotive force (e.m.f.) of the battery.

..... [1]

(b) **(i)** The resistance of wire CD is 8.7 Ω and the resistance of the variable resistor is 7.4 Ω.

Determine the combined resistance of the wire CD and the variable resistor.

resistance = ... Ω [1]

(ii) The current in the variable resistor is 0.40 A.

State the current in wire CD.

current = ... A [1]

[Total: 7]

25. Nov/2020/Paper_32/No.10

Fig. 10.1 shows a metal kettle used for heating water. The kettle is connected to the mains power supply. The metal case is connected to earth. A fault causes the live wire to come loose and touch the metal case, as shown.

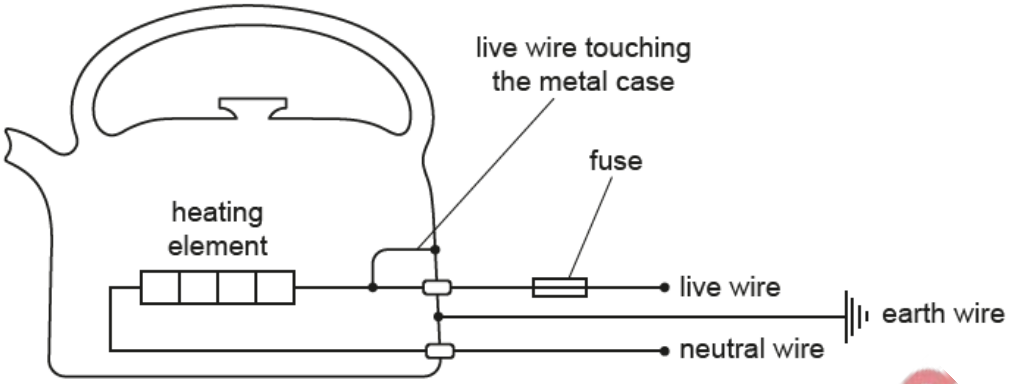


Fig. 10.1

(a) **(i)** The kettle is switched on. There is a very large electric current in the live wire.

Explain why this large electric current can be dangerous.

.....

..... [1]

(ii) Explain how a fuse helps to protect against the danger of a large electric current.

.....

.....

..... [2]

(iii) Explain why the kettle is **not** safe to use with the fuse connected into the neutral wire instead of the live wire.

.....

..... [1]

(b) The current in a device when operating normally is 3.1A.

State a suitable value for the fuse.

Choose **one** of these values: 3A, 5A, 10A and 13A.

..... [1]

(c) A small kettle has a potential difference (p.d.) of 12 V (d.c.) across its heating element. The current in the heating element is 2.5 A.

Calculate the resistance of the heating element.

resistance of the heating element = ... Ω [3]

[Total: 8]

26. Nov/2020/Paper_33/No.8

(a) Fig. 8.1 shows the electrical symbols for some circuit components.

Identify the circuit component for each electrical symbol.

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

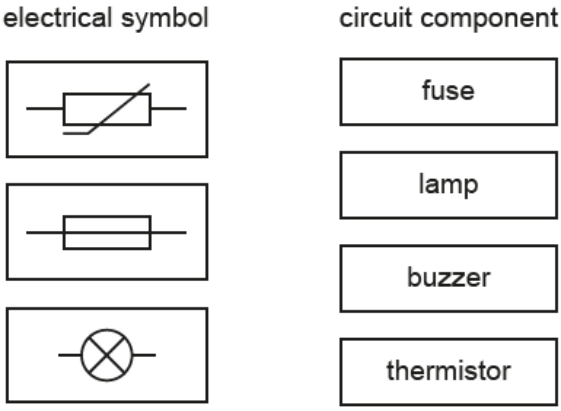


Fig. 8.1

[3]

(b) A student connects the circuit shown in Fig. 8.2. The value of the fixed resistor is 20 Ω.

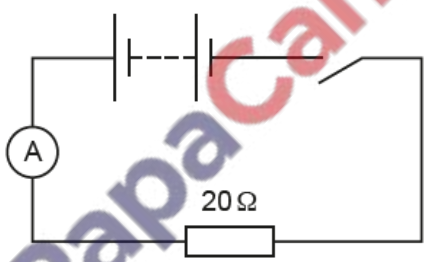


Fig. 8.2

The switch is closed. The reading on the ammeter is 0.30 A.

(i) Calculate the potential difference (p.d.) across the fixed resistor.

potential difference = ... V [3]

(ii) State the name of the device for measuring potential difference.

..... [1]

(iii) Show how the student connects the device stated in **(b)(ii)** to measure the p.d. across the fixed resistor. Draw the correct symbol and connections on Fig. 8.2. [1]

[Total: 8]

27. Nov/2020/Paper_41/No.8

(a) Explain what is meant by *electromotive force* (*e.m.f.*).

.....

.....

..... [2]

(b) An electric heater contains two heating elements R_1 and R_2. An electric motor operates a fan. The fan blows cool air over the heating elements.

Fig. 8.1 shows the circuit.

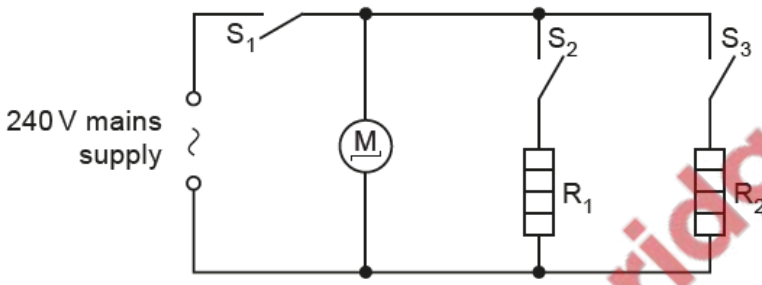


Fig. 8.1

The heater is powered by a mains supply of e.m.f. 240 V.

Switches S_1 and S_2 are closed. Heating element R_1 gets hot. The resistance of R_1 is 30 Ω.

(i) Calculate the current in heating element R_1.

current = ... [1]

(ii) Calculate the power produced in heating element R_1.

power = ... [2]

(iii) The resistance of heating element R_2 is 60 Ω.

Switches S_1, S_2 and S_3 are closed.

1. State and explain how the current in R_2 compares with the current in R_1.

.....

.....

..... [2]

2. The current in the motor is 0.10A. The cable from the electric heater to the plug for the mains socket is safe when the current in it is less than 20A.

Suggest and explain a suitable fuse rating for this circuit.

.....

.....

.....

..... [2]

[Total: 9]

28. Nov/2020/Paper_42/No.8

(a) State and explain why electrical sockets and plugs used outside in a garden need to be different from those that can be used safely in a room inside a house.

.....

.....

.....

..... [2]

(b) State and explain why fuses and circuit breakers are installed in electrical circuits connected to the mains supply.

.....

.....

.....

..... [2]

[Total: 4]

29. Nov/2020/Paper_42/No.10

Fig. 10.1 shows an incomplete electrical circuit.

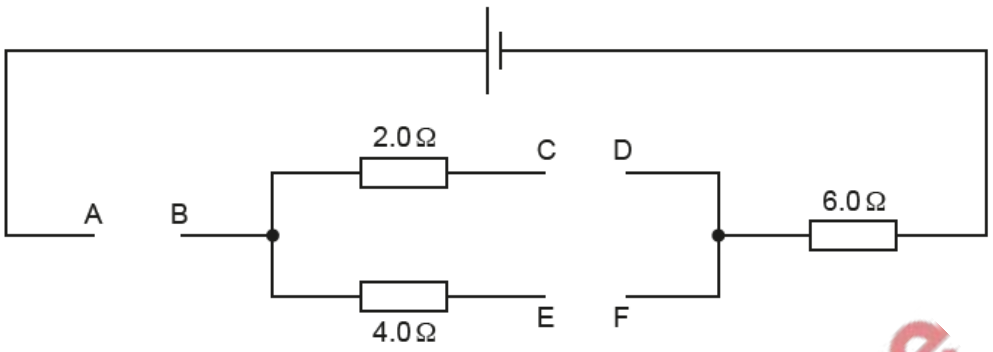


Fig. 10.1

(a) (i) A student completes the circuit and measures the current in the 6.0 Ω resistor.

On Fig. 10.1, draw an ammeter symbol in one gap and straight lines to indicate wires in the other gaps to show how the student should do this. [1]

(ii) A voltmeter is connected to measure the potential difference (p.d.) across the 4.0 Ω resistor.

On Fig. 10.1, draw a voltmeter symbol connected in the correct position. [2]

(iii) With the circuit completed, the current in the 2.0 Ω resistor is 2.5A.

Calculate the current in the 6.0 Ω resistor.

current = ... [4]

(b) Fig. 10.2 shows the same electrical circuit with an alternating current (a.c.) power supply and a wire in the gap AB.

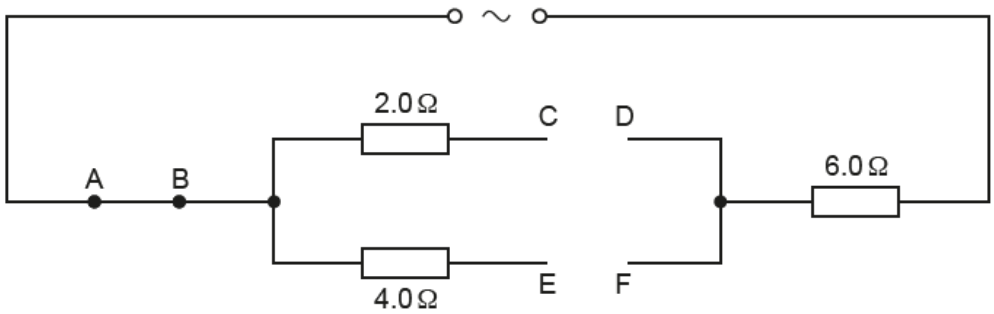


Fig. 10.2

On Fig. 10.2, draw a diode symbol in one gap and a straight line to indicate a wire in the other gap so that there is a current from right to left in the 4.0 Ω resistor and an alternating current in the 2.0 Ω resistor. [2]

[Total: 9]

30. Nov/2020/Paper_43/No.8

(a) (i) Fig. 8.1 shows an electrical circuit. The resistor has a resistance of 4.0 Ω. The reading on the voltmeter is 3.0 V.

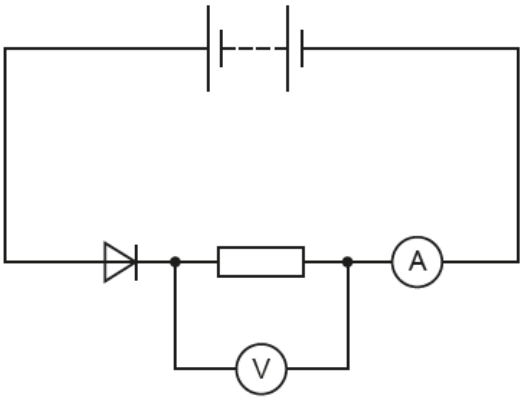


Fig. 8.1

Calculate the current in the resistor.

current = ... [2]

(ii) Fig. 8.2 shows the same circuit with one component reversed.

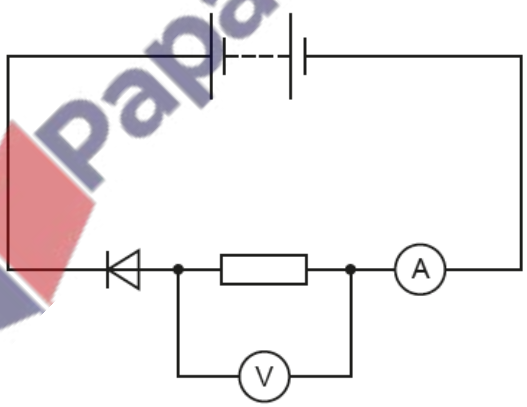


Fig. 8.2

State the reading on the voltmeter and explain your answer.

reading = ...

explanation .....

.....

[2]