Electricity – 2022 June IGCSE 0625

1. June/2022/Paper_11/No.29

A large battery is labelled with various items of information about the battery.

12 V	30 kg	216 kJ	680 A

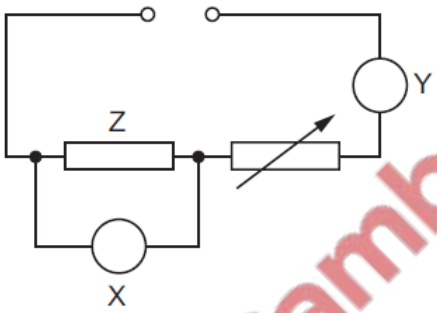
One of these items of information is the electromotive force (e.m.f.) of the battery.

What is the e.m.f. of the battery?

A 12 V **B** 30 kg **C** 216 kJ **D** 680 A

2. June/2022/Paper_11/No.30

The circuit shown is being used to measure the resistance of resistor Z.



What is the correct combination of meters to determine the resistance of resistor Z?

	meter X	meter Y
A	ammeter	ammeter
B	ammeter	voltmeter
C	voltmeter	ammeter
D	voltmeter	voltmeter

3. June/2022/Paper_11/No.31

The diagram shows the circuit diagram symbol of an electrical component.

Which component does the symbol represent?

A light-dependent resistor

B relay coil

C thermistor

D variable resistor

4. June/2022/Paper_11/No.32

What is the advantage of connecting lamps in parallel in a lighting circuit?

A A smaller fuse is needed to protect the lamps.

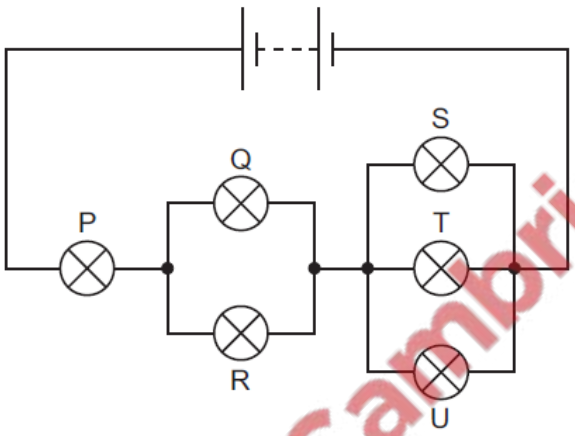
B If the filament of one lamp breaks, the remaining lamps stay lit.

C The current taken from the supply is less.

D The lamps use less power.

5. June/2022/Paper_11/No.33

The diagram shows a circuit of six identical lamps connected to a battery.



Which lamps are brightest?

A P only

B Q and R only

C S, T and U only

D P, Q, R, S, T and U are equally bright

6. June/2022/Paper_11/No.34

Why is a fuse used in an electrical circuit?

A so that the current can have only one value

B to prevent the current becoming too large

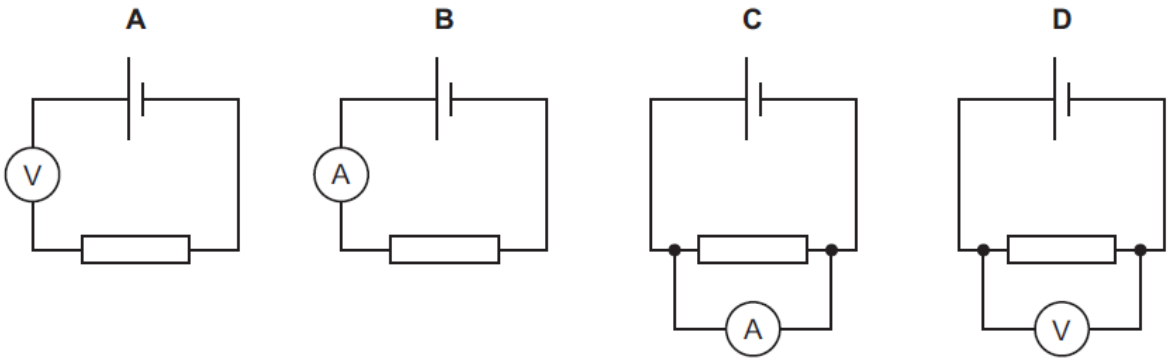
C to provide a path to earth if a fault occurs

D to save electrical energy

7. June/2022/Paper_12/No.29

Four circuits are set up.

In which circuit does the meter measure the potential difference (p.d.) across the resistor?



8. June/2022/Paper_12/No.30

A resistor has a potential difference (p.d.) of 12 V across it and a current of 0.60 A in it.

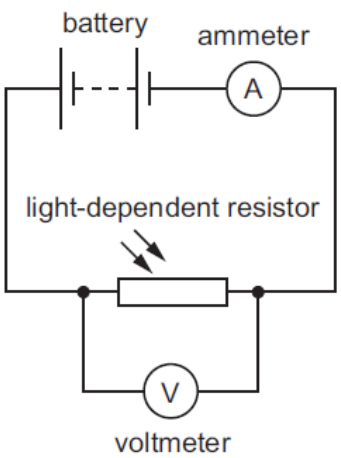
What is the resistance of the resistor?

A 0.050 Ω **B** 2.0 Ω **C** 7.2 Ω **D** 20 Ω

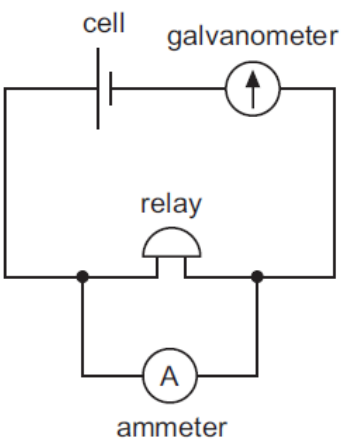
9. June/2022/Paper_12/No.31

Which circuit is correctly labelled?

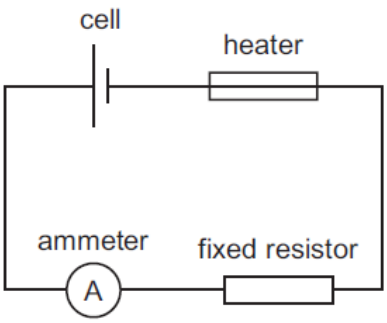
A



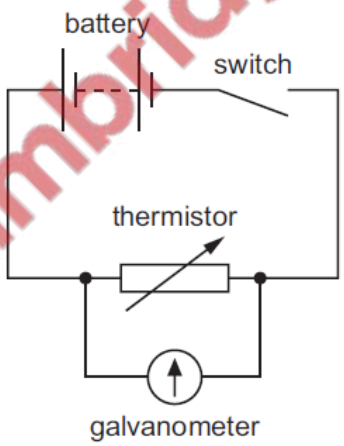
B



C

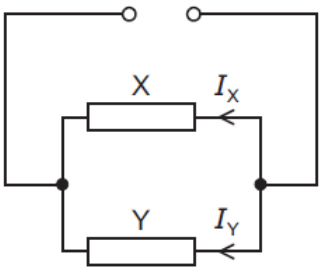


D



10. June/2022/Paper_12/No.32

The diagram shows an electric circuit.



I_X is the current in resistor X. I_Y is the current in resistor Y.

Which statement describes the current from the power supply?

A greater than I_X and greater than I_Y

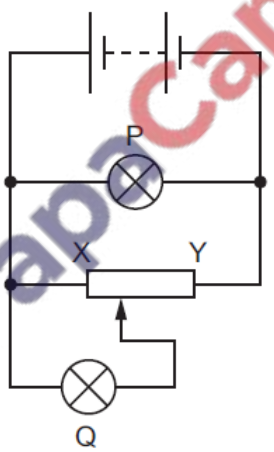
B greater than I_X and less than I_Y

C less than I_X and greater than I_Y

D less than I_X and less than I_Y

11. June/2022/Paper_12/No.33

The diagram shows a battery connected to a potential divider and to two lamps, P and Q.



The slider on the potential divider is moved from end X to end Y of the resistor.

Which row shows the effect on the brightness of each lamp?

	brightness of P	brightness of Q
A	brighter	brighter
B	brighter	dimmer
C	unchanged	brighter
D	unchanged	dimmer

12. June/2022/Paper_12/No.34

Why is a fuse used in an electrical circuit?

A so that the current can have only one value

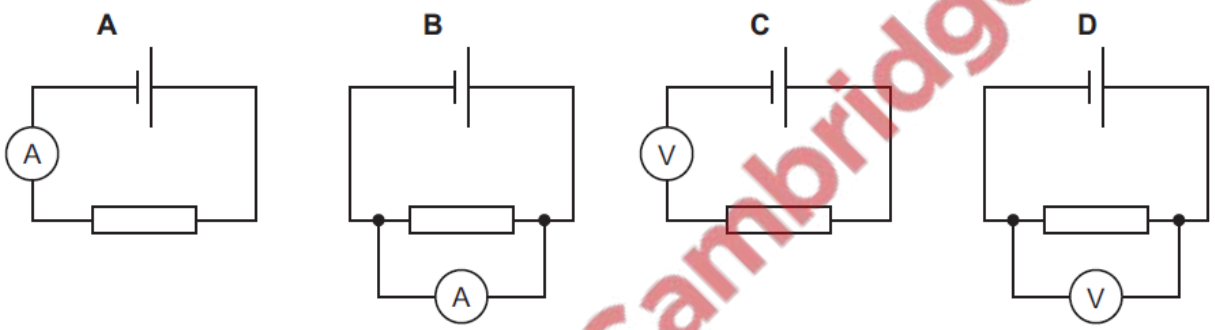
B to prevent the current becoming too large

C to provide a path to earth if a fault occurs

D to save electrical energy

13. June/2022/Paper_13/No.29

Which circuit shows a meter being used correctly to measure the current in a resistor?



14. June/2022/Paper_13/No.30

A resistor and a battery are connected in series.

The value of the resistor is 20 Ω.

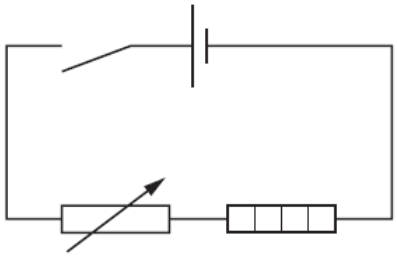
The potential difference (p.d.) of the battery is 4.0 V.

What is the current in the resistor?

A 0.20 A **B** 4.0 A **C** 5.0 A **D** 80 A

15. June/2022/Paper_13/No.31

The circuit shown includes a cell.



Which other components does the circuit contain?

A lamp, voltmeter and switch

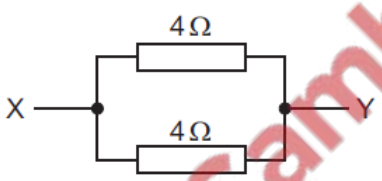
B resistor, thermistor and bell

C switch, variable resistor and heater

D switch, heater and fuse

16. June/2022/Paper_13/No.32

Two 4 Ω resistors are connected in parallel.



What is the combined resistance between X and Y?

A less than 4 Ω

B 4 Ω

C 8 Ω

D more than 8 Ω

17. June/2022/Paper_13/No.33

Which statement about identical lamps in a parallel circuit is **not** correct?

A If one lamp blows, the others remain switched on.

B The current in each lamp is different.

C The lamps can be switched on and off separately.

D The lamps have the same voltage across each of them.

18. June/2022/Paper_13/No.34

Why is a fuse used in an electrical circuit?

A so that the current can have only one value

B to prevent the current becoming too large

C to provide a path to earth if a fault occurs

D to save electrical energy

19. June/2022/Paper_13/No.35

The information describes the currents in three different circuits.

Circuit P has a steady current of 0.52 A in one direction.

Circuit Q has a current that continually changes between 0.25 A and 0.35 A but is always in the same one direction.

Circuit R has a peak current of 0.52 A that changes direction periodically.

Which circuits contain a direct current?

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

20. June/2022/Paper_21/No.30

Which unit is equivalent to a volt (V)?

A A/Ω **B** J/C **C** J/s **D** W/C

21. June/2022/Paper_21/No.31

A resistor converts 360 J of energy when there is a current of 3.0 A in it. The potential difference across the resistor is 6.0 V.

For how long is there this current in the resistor?

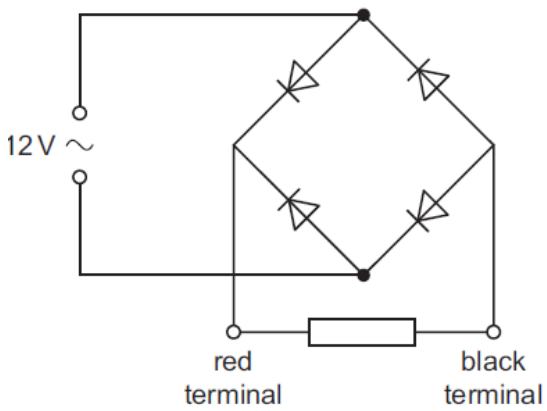
A 0.05 s **B** 20 s **C** 180 s **D** 720 s

22. June/2022/Paper_21/No.32

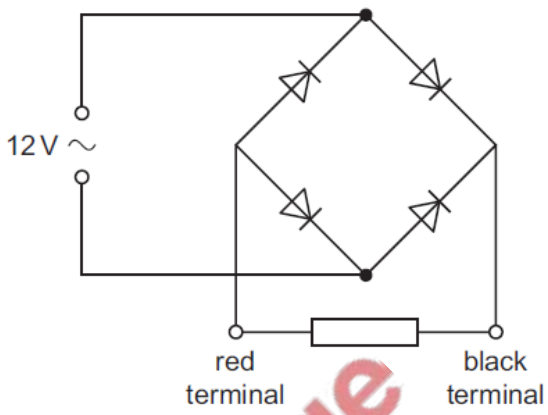
The four circuits shown each contain four diodes.

In which circuit is the direction of the current in the resistor always from the red terminal to the black terminal?

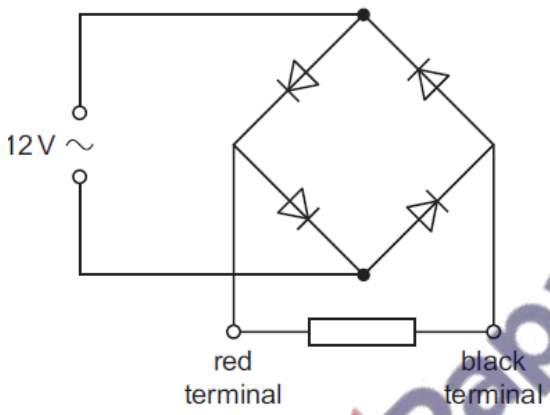
A



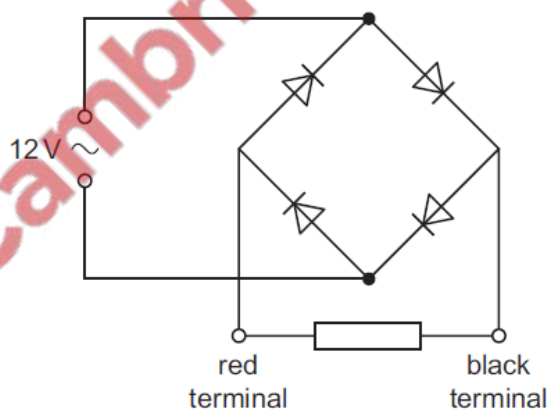
B



C

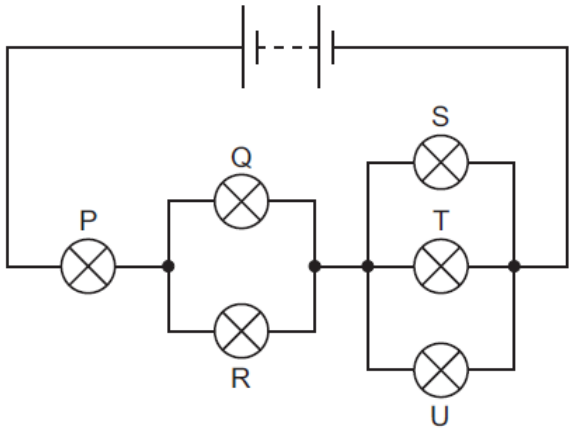


D



23. June/2022/Paper_21/No.33

The diagram shows a circuit of six identical lamps connected to a battery.



Which lamps are brightest?

A P only

B Q and R only

C S, T and U only

D P, Q, R, S, T and U are equally bright

24. June/2022/Paper_22/No.30

A resistor has a potential difference (p.d.) of 12 V across it and a current of 0.60 A in it.

What is the resistance of the resistor?

A 0.050 Ω **B** 2.0 Ω **C** 7.2 Ω **D** 20 Ω

25. June/2022/Paper_22/No.31

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

Which equation gives the power P dissipated in the resistor?

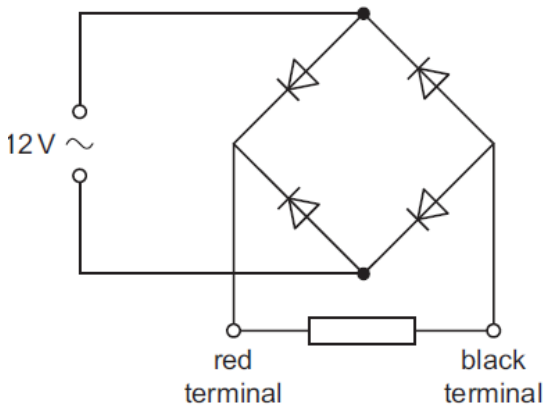
A $P = IR$ **B** $P = It$ **C** $P = IV$ **D** $P = \frac{IV}{t}$

26. June/2022/Paper_22/No.32

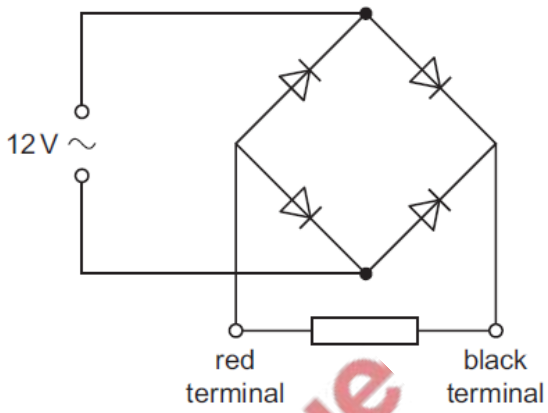
The four circuits shown each contain four diodes.

In which circuit is the direction of the current in the resistor always from the red terminal to the black terminal?

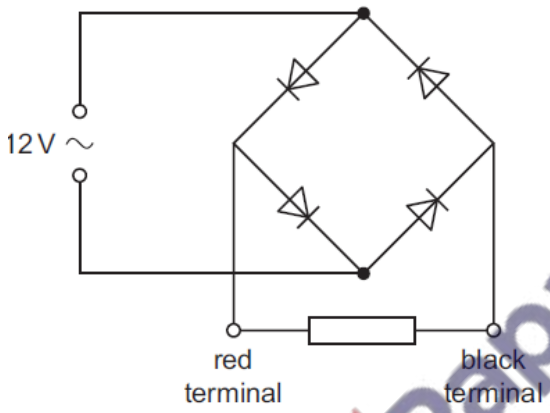
A



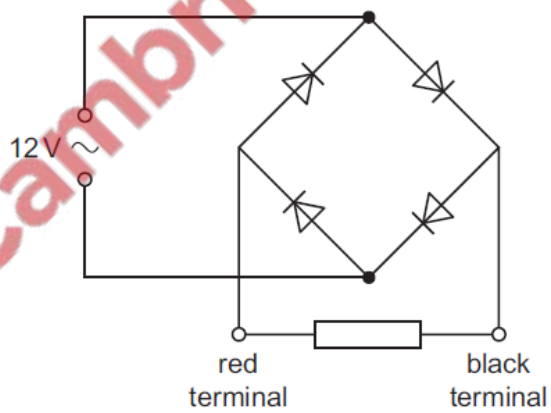
B



C

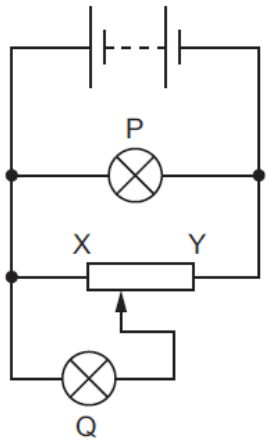


D



27. June/2022/Paper_22/No.33

The diagram shows a battery connected to a potential divider and to two lamps, P and Q.



The slider on the potential divider is moved from end X to end Y of the resistor.

Which row shows the effect on the brightness of each lamp?

	brightness of P	brightness of Q
A	brighter	brighter
B	brighter	dimmer
C	unchanged	brighter
D	unchanged	dimmer

28. June/2022/Paper_23/No.26

A resistor and a battery are connected in series.

The value of the resistor is 20 Ω.

The potential difference (p.d.) of the battery is 4.0 V.

What is the current in the resistor?

A 0.20 A **B** 4.0 A **C** 5.0 A **D** 80 A

29. June/2022/Paper_23/No.31

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

A student calculates the product IVt.

In which unit is the student's answer measured?

A ampere

B coulomb

C joule

D watt

30. June/2022/Paper_23/No.32

Which statement about identical lamps in a parallel circuit is **not** correct?

A If one lamp blows, the others remain switched on.

B The current in each lamp is different.

C The lamps can be switched on and off separately.

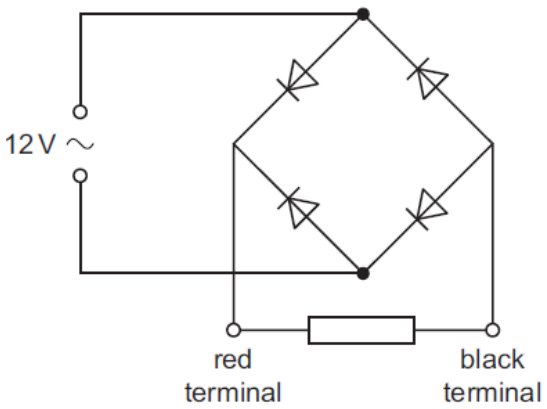
D The lamps have the same voltage across each of them.

31. June/2022/Paper_23/No.33

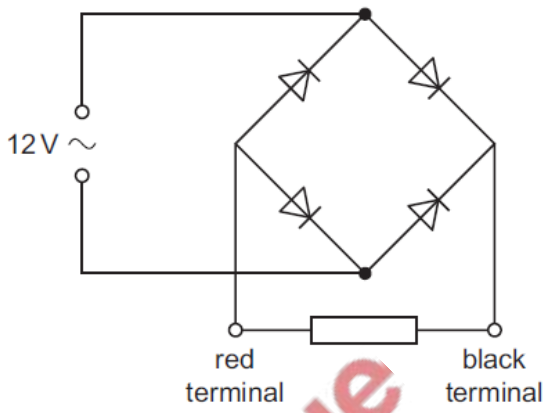
The four circuits shown each contain four diodes.

In which circuit is the direction of the current in the resistor always from the red terminal to the black terminal?

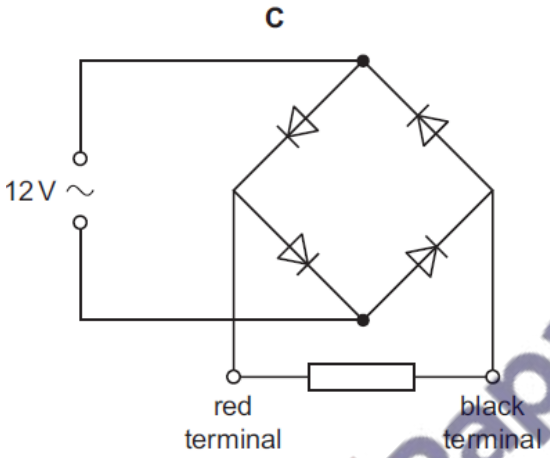
A



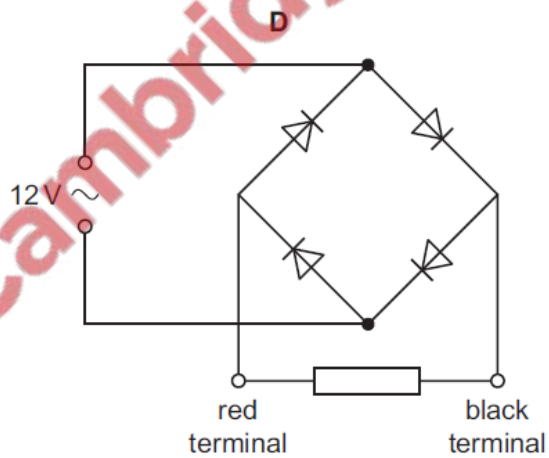
B



C



D



32. June/2022/Paper_31/No.9

Fig. 9.1 shows an electric circuit which includes uninsulated resistance wire XY. A teacher shows some students how to complete the circuit by placing the contact C at various positions on the wire XY.

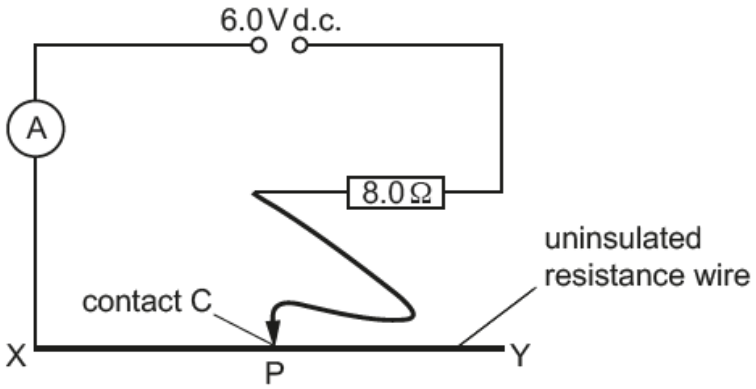


Fig. 9.1

(a) The students place contact C at Y. They measure the current on the ammeter. Then they move the contact C along the wire from Y to X.

State and explain the effect on the ammeter reading when they move the contact C from Y to X.

.....

..... [2]

(b) Calculate the reading on the ammeter when contact C is at X.

ammeter reading = ... A [3]

(c) The students move contact C to point P. The resistance of the wire between X and P is 20 Ω.

Calculate the total resistance of the resistance wire between X and P and the fixed resistor.

total resistance = ... Ω [2]

(d) The electric current in the circuit produces two effects.

Place a tick (✓) in the boxes next to these **two** effects.

gravitational	☐
magnetic	☐
heating	☐
sound	☐
X-ray emissions	☐

[2]

[Total: 9]

33. June/2022/Paper_31/No.10(c)

A microwave oven has a metal case and is connected to a 240 V electricity supply.

(a) The microwave oven is fitted with a 13A fuse and an earth wire is connected to the metal case of the microwave oven. A fault occurs and the live wire of the microwave oven touches the metal case.

Explain how the fuse and an earthed metal case protect the appliance and the user.

.....

.....

.....

.....

..... [4]

34. June/2022/Paper_32/No.9

A student has a battery-operated torch. Fig. 9.1 shows the electrical components in the torch circuit.

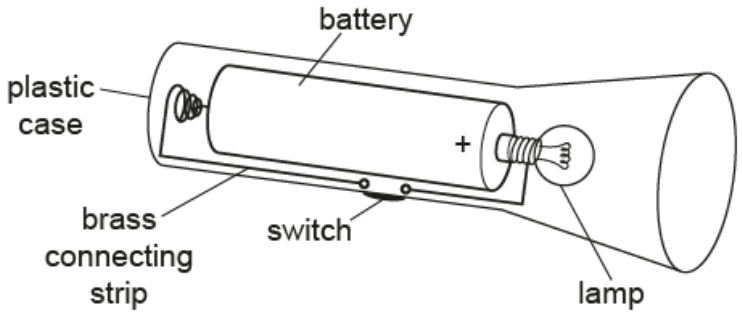


Fig. 9.1

(a) Using standard symbols, draw a circuit diagram for the circuit in the torch.

[4]

(b) When the torch is switched on, the potential difference (p.d.) across the lamp is 1.4 V and the current in the lamp is 0.26 A.

(i) State the current in the brass connecting strip.

current = ...A [1]

(ii) Calculate the resistance of the lamp.

resistance = ... Ω [3]

[Total: 8]

35. June/2022/Paper_33/No.9

The circuit in Fig. 9.1 shows two resistors, a battery, a voltmeter and a switch connected by metal wires.

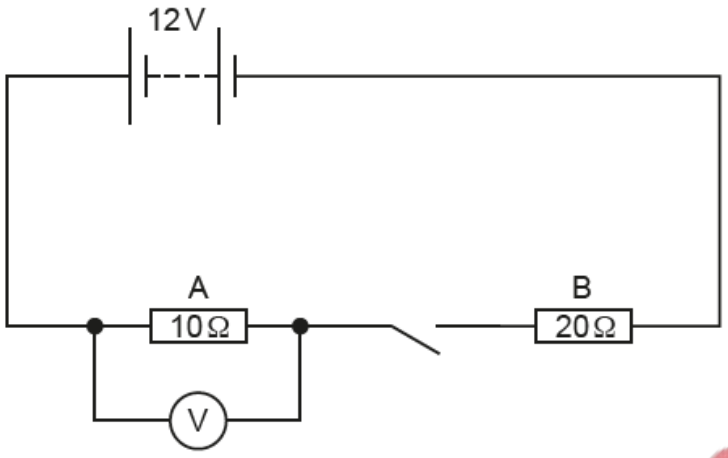


Fig. 9.1

(a) State a quantity that a voltmeter measures.

..... [1]

(b) The switch is closed. There is a current in the circuit.

(i) State the name of the type of particle that flows in the metal wires.

..... [1]

(ii) State the name of an instrument that measures electric current.

..... [1]

(c) The reading on the voltmeter is 4.0 V.

(i) Calculate the current in the 10 Ω resistor.

current = ... A [3]

(ii) Determine the current in the 20 Ω resistor.

current = ... A [1]

(iii) The 10 Ω resistor is replaced by a 15 Ω resistor **and** the 20 Ω resistor is also replaced by a 15 Ω resistor.

State the effect, if any, on the current in the circuit. Explain your answer.

.....

..... [2]

[Total: 9]

36. June/2022/Paper_41/No.5(c)

(c) The metal tap is earthed and there is a fuse in the cable that connects the heater to the mains.

1. Explain how the earth wire protects the user.

.....

.....

2. Explain how the fuse protects the circuit.

.....

..... [3]

37. June/2022/Paper_42/No.8

Fig. 8.1 shows how the electromotive force (e.m.f.) of a 60 Hz alternating current (a.c.) power supply varies with time.

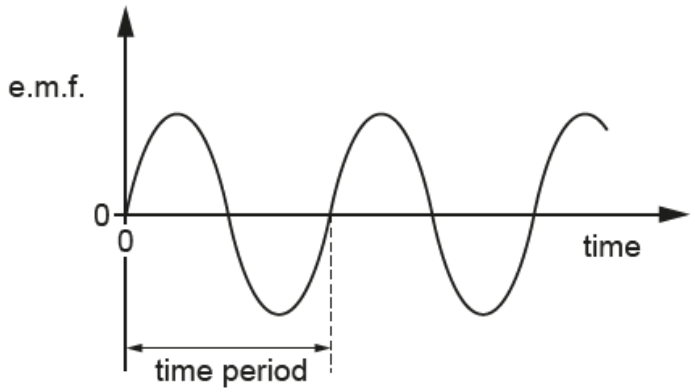


Fig. 8.1

(a) Calculate the time period of the a.c.

time period = ... [1]

(b) Fig. 8.2 shows this power supply connected in a circuit.

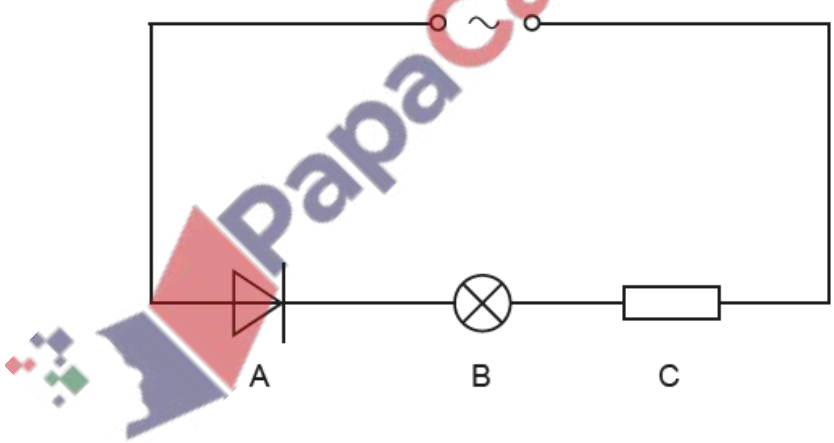


Fig. 8.2

(i) State the name of component A.

..... [1]

(ii) In each time period of the a.c., 1.5×10^{17} electrons pass through component A. The charge on an electron is 1.6×10^{-19} C.

Calculate the average current in the circuit during one time period.

current = ... [3]

(c) On Fig. 8.3:

1. mark, with an arrow labelled E, the direction of the electron flow through component B

2. mark, with an arrow labelled I, the direction of the conventional current in component C.

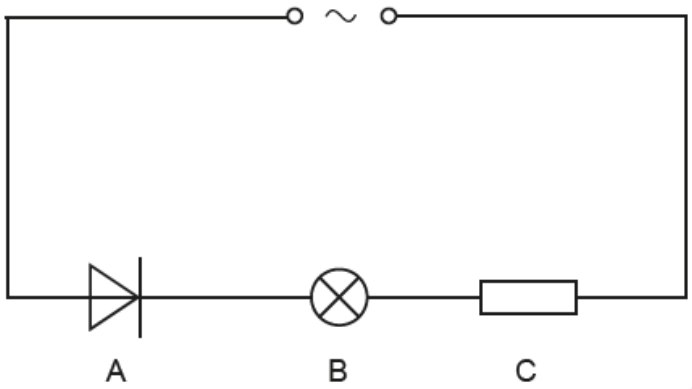


Fig. 8.3

[2]

(d) Fig. 8.4 shows a circuit with components B and C connected to a direct current (d.c.) power supply of e.m.f. 12 V.

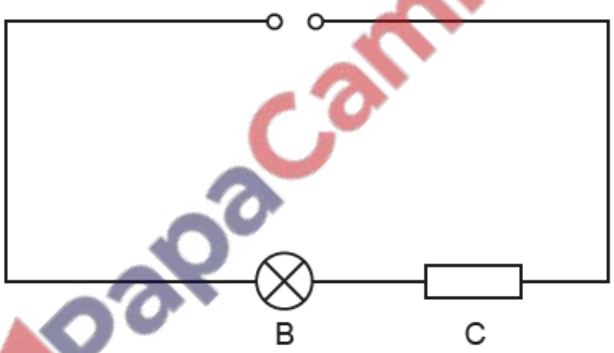


Fig. 8.4

The current in the circuit is 0.35 A.

Calculate the power delivered by the power supply to the circuit.

power = ... [2]

[Total: 9]

38. June/2022/Paper_42/No.9

Fig. 9.1 shows a circuit with a 3-position switch.

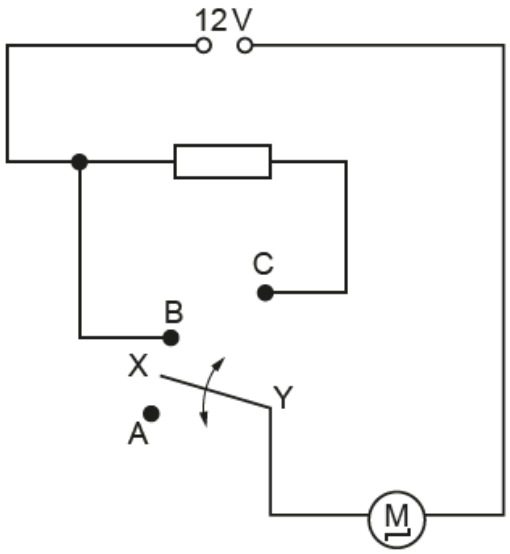


Fig. 9.1

The moving part of the switch is always connected to point Y around which it pivots. The other end of the moving part, labelled X, can be connected to one of the points A, B or C.

(a) The resistance of the motor is 2.0 Ω and the resistance of the resistor is 3.0 Ω.

Determine the current in the motor when the switch is connected to:

(i) point A

current = ... [1]

(ii) point B

current = ... [2]

(iii) point C.

current = ... [2]

(b) Two resistors of resistance 2.0 Ω and 3.0 Ω are connected in parallel.

Calculate the combined resistance of the resistors in this arrangement.

resistance = ... [3]

[Total: 8]

39. June/2022/Paper_43/No.8

(a) Fig. 8.1 shows a circuit.

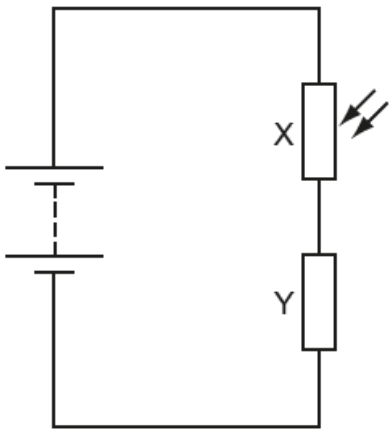


Fig. 8.1

(i) State the name of component X.

..... [1]

(ii) The potential difference (p.d.) across component Y is measured with a voltmeter.

On Fig. 8.1, draw the symbol for the voltmeter and its connections to the circuit. [1]

(iii) The electromotive force (e.m.f.) of the battery is 12 V.

Component Y has a resistance of 400 Ω.

In a brightly lit room, the resistance of component X is 350 Ω.

1. Calculate the current in the circuit.

current = ... [2]

2. Calculate the p.d. across component Y.

p.d. = ... [1]

(iv) In a dark room, the resistance of component X is very large.

State the effect this will have on the p.d. across component Y.

..... [1]

(b) Suggest a practical use for component X.

..... [1]

[Total: 7]