Electricity – 2023 IGCSE Physics 0625

1. Nov/2023/Paper_ 0625/11/No.26

Which statement about a voltmeter is correct?

A It has a scale which is marked in amperes (A).

B It must be connected in series in a circuit.

C It measures potential difference (p.d.).

D It must have three terminals.

2. Nov/2023/Paper_ 0625/11/No.27

How does the resistance of a metallic wire change:

- as its length increases
- as its cross-sectional area decreases?

	resistance as length increases	resistance as cross-sectional area decreases
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

3. Nov/2023/Paper_ 0625/11/No.29

Two 2.0 Ω resistors are connected in parallel.

What is the combined resistance of the resistors?

A less than 2.0 Ω

B exactly 2.0 Ω

C more than 2.0 Ω, but less than 4.0 Ω

D exactly 4.0 Ω

4. Nov/2023/Paper_ 0625/11/No.30

An electric heater is plugged into the mains supply using a fused plug.

The current in the heater is 10 A.

The cable attached to the heater is rated at 15 A.

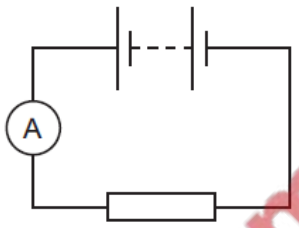
The fuses available are rated at 1.0 A, 3.0 A, 5.0 A and 13 A.

Which fuse should be used?

A 1.0 A **B** 3.0 A **C** 5.0 A **D** 13 A

5. Nov/2023/Paper_ 0625/12/No.25

A battery is connected to an ammeter and a resistor.



The ammeter reading is 0.20 A.

An electrical insulator is connected in parallel with the resistor.

What is the ammeter reading?

A 0 A

B between 0 A and 0.20 A

C 0.20 A

D greater than 0.20 A

6. Nov/2023/Paper_ 0625/12/No.26

Which unit is used to measure electromotive force (e.m.f.)?

A ampere

B joule

C volt

D watt

7. Nov/2023/Paper_ 0625/12/No.27

Which equation is correct for resistance R, potential difference (p.d.) V and current I?

A $R = \frac{V}{I}$ **B** $R = V + I$ **C** $R = \frac{I}{V}$ **D** $R = V \times I$

8. Nov/2023/Paper_ 0625/12/No.29

In which heating system circuit would thermistors **not** be useful?

A to keep different rooms at different temperatures

B to turn an alarm on if the system overheats

C to turn a heating system off at a particular temperature

D to turn a heating system on when a sound is detected

9. Nov/2023/Paper_ 0625/12/No.30

Which statement is correct?

A A fuse is included in a circuit to prevent the current becoming too high.

B A fuse should be connected to the neutral wire in a plug.

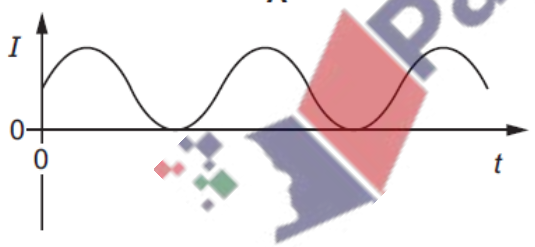
C An electric circuit will only work if it includes a fuse.

D An earth wire is needed to prevent the fuse blowing.

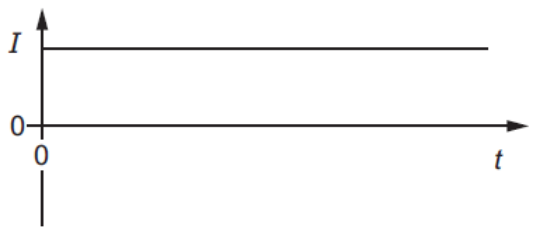
10. Nov/2023/Paper_ 0625/12/No.31

Which graph of current I against time t represents an alternating current (a.c.)?

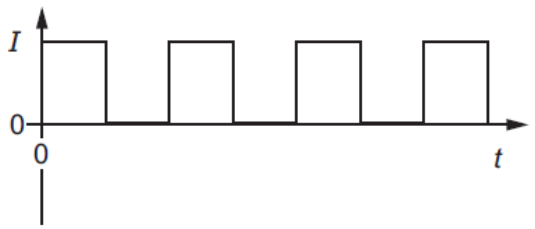
A



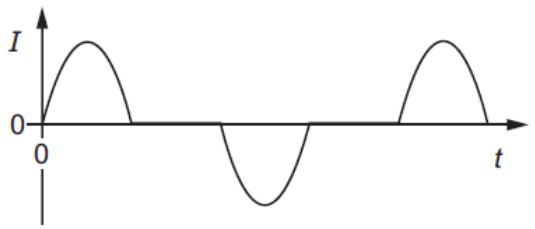
B



C

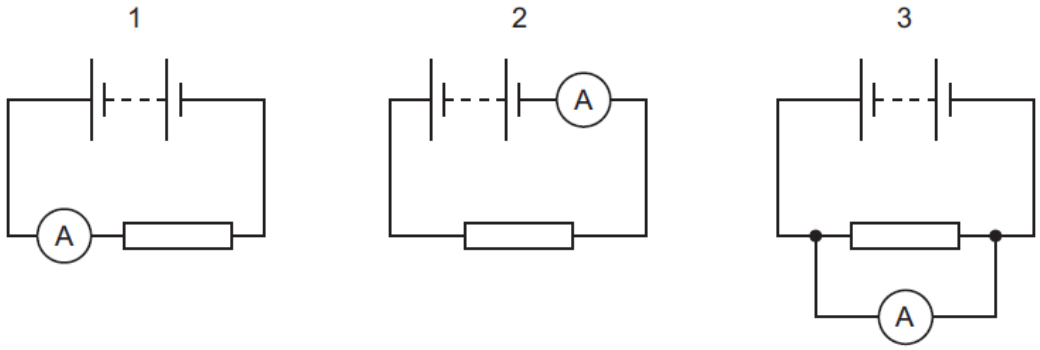


D



11. Nov/2023/Paper_ 0625/13/No.25

A student uses an ammeter to measure the current in a resistor. He considers three different circuits, as shown.



In which of the circuits does the ammeter measure the current in the resistor?

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

12. Nov/2023/Paper_ 0625/13/No.26

Which substances both contain large concentrations of free electrons?

A aluminium and glass

B copper and water

C copper and nylon

D silver and gold

13. Nov/2023/Paper_ 0625/13/No.27

What is the unit of resistance?

A ampere

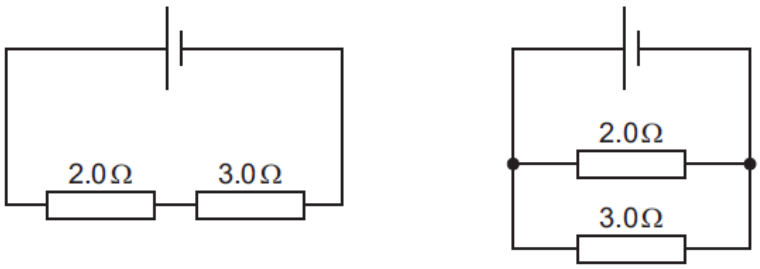
B ohm

C volt

D watt

14. Nov/2023/Paper_ 0625/13/No.29

Resistors of resistance 2.0 Ω and 3.0 Ω are connected in two different circuits.



What is the total resistance in each circuit?

	series	parallel
A	less than 2.0 Ω	less than 2.0 Ω
B	less than 2.0 Ω	greater than 3.0 Ω
C	greater than 3.0 Ω	less than 2.0 Ω
D	greater than 3.0 Ω	greater than 3.0 Ω

15. Nov/2023/Paper_ 0625/13/No.30

The current in an electrical heater is 5.0 A.

The heater is connected to the mains by a flexible cable that can carry a current of up to 15 A. The mains circuit can carry a current of up to 30 A.

Different fuses are available to protect the heater's cable.

Which fuse is the most suitable?

A 4.0 A **B** 10 A **C** 20 A **D** 40 A

16. Nov/2023/Paper_ 0625/21/No.26

Which statement about a voltmeter is correct?

A It has a scale which is marked in amperes (A).

B It must be connected in series in a circuit.

C It measures potential difference (p.d.).

D It must have three terminals.

17. Nov/2023/Paper_ 0625/21/No.27

A wire has a resistance of 8.0 Ω.

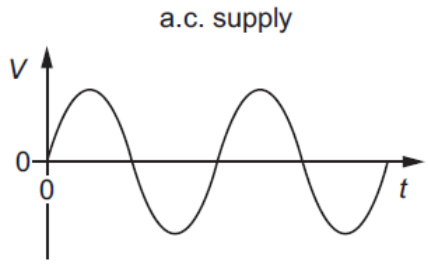
A second wire of the same material has twice the length and twice the cross-sectional area.

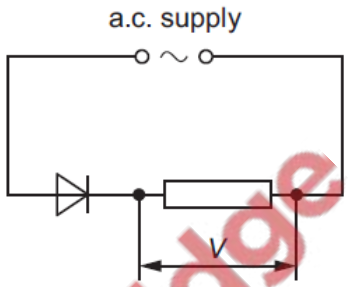
What is the resistance of the second wire?

A 4.0 Ω **B** 8.0 Ω **C** 16 Ω **D** 32 Ω

18. Nov/2023/Paper_ 0625/21/No.29

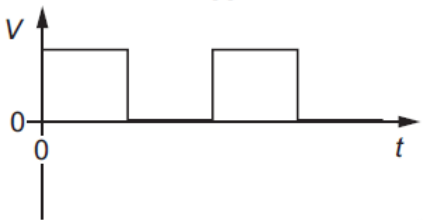
An alternating (a.c.) supply is connected to a diode and a resistor in series.



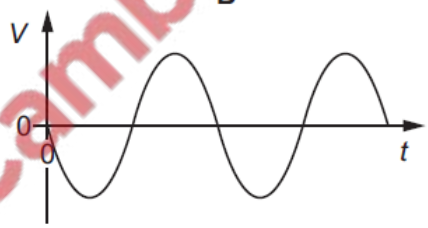


Which graph shows how the potential difference *V* across the resistor varies with time *t*?

A

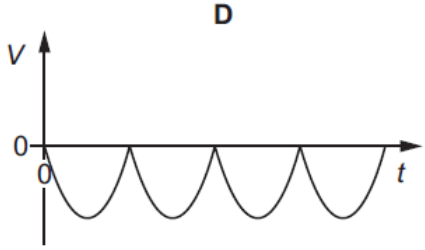


B



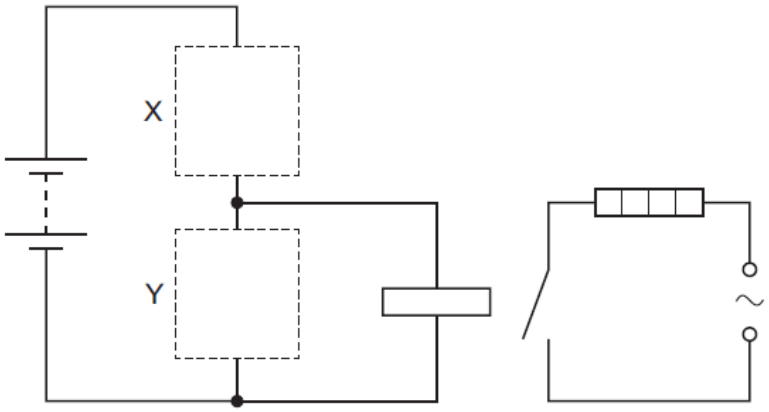
C

D

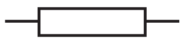
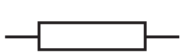
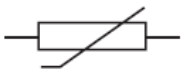


19. Nov/2023/Paper_ 0625/21/No.30

The diagram shows a circuit used to switch on a heater when the temperature drops below a certain value.

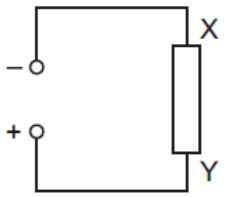


Which row shows the components that should be connected at X and at Y?

	X	Y
A		
B		
C		
D		

20. Nov/2023/Paper_ 0625/22/No.25

A power source is connected to a resistor XY.



In which directions are the conventional current and the flow of free electrons through the resistor?

	conventional current	free electron flow
A	X to Y	X to Y
B	X to Y	Y to X
C	Y to X	X to Y
D	Y to X	Y to X

21. Nov/2023/Paper_ 0625/22/No.26

Which unit is used to measure electromotive force (e.m.f.)?

A ampere

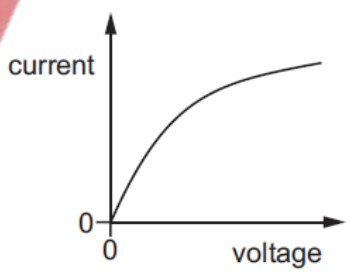
B joule

C volt

D watt

22. Nov/2023/Paper_ 0625/22/No.27

The graph shows the current–voltage characteristic for a filament lamp.



Which statement describes how the resistance of the lamp changes as the voltage increases?

A The resistance decreases to zero.

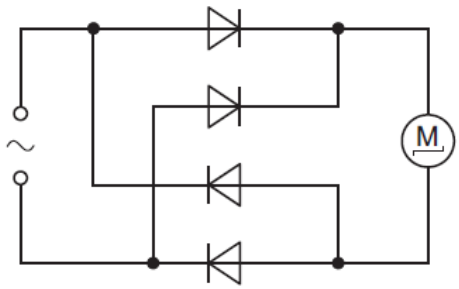
B The resistance decreases, but not to zero.

C The resistance increases.

D The resistance remains constant.

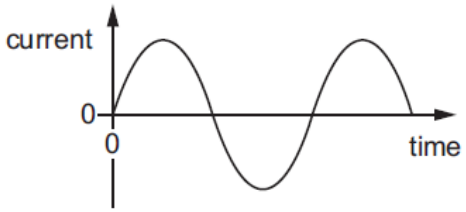
23. Nov/2023/Paper_ 0625/22/No.29

The circuit diagram shows a circuit used to run a d.c. motor from an a.c. supply.



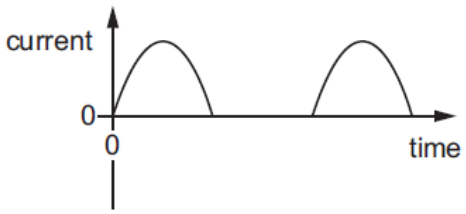
Which graph shows the current in the motor?

A

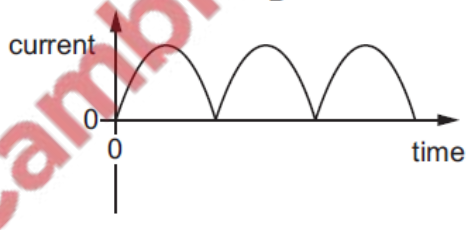


B

C

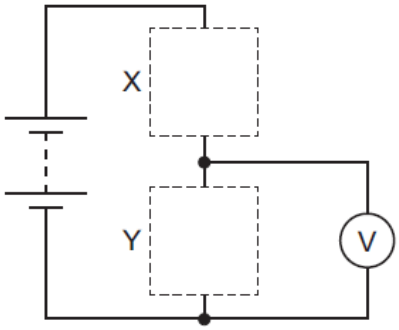


D



24. Nov/2023/Paper_ 0625/22/No.30

The circuit shown can be completed by inserting components at X and at Y. The completed circuit is a potential divider in which the potential difference across component Y increases when the temperature increases.

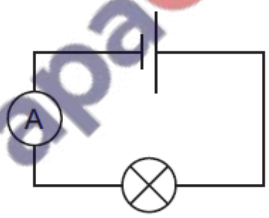


Which row shows the components X and Y?

	X	Y
A	light-dependent resistor	resistor
B	resistor	light-dependent resistor
C	resistor	thermistor
D	thermistor	resistor

25. Nov/2023/Paper_ 0625/23/No.25

The diagram shows an electric circuit.



In which direction do free electrons flow around this circuit and what quantity does the ammeter measure?

	direction of electron flow	quantity measured by the ammeter
A	anticlockwise	charge passing each point in the circuit per unit time
B	anticlockwise	total charge passing through the ammeter
C	clockwise	charge passing each point in the circuit per unit time
D	clockwise	total charge passing through the ammeter

26. Nov/2023/Paper_ 0625/23/No.26

Which substances both contain large concentrations of free electrons?

A aluminium and glass

B copper and water

C copper and nylon

D silver and gold

27. Nov/2023/Paper_ 0625/23/No.27

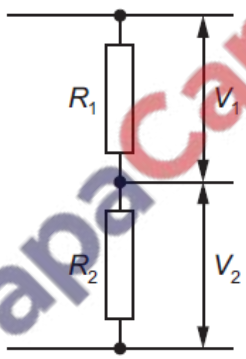
A resistance wire of length L melts and has to be replaced with a wire of the same material and the same resistance. The only wire available has twice the diameter of the broken wire.

Which length of this wire should be used?

A $\frac{L}{4}$ **B** $\frac{L}{2}$ **C** $2L$ **D** $4L$

28. Nov/2023/Paper_ 0625/23/No.29

Two resistors, with resistances R_1 and R_2, are used as a potential divider.



What is the relationship between R_1, R_2 and potential differences V_1 and V_2?

A $R_1 \times R_2 = V_1 \times V_2$

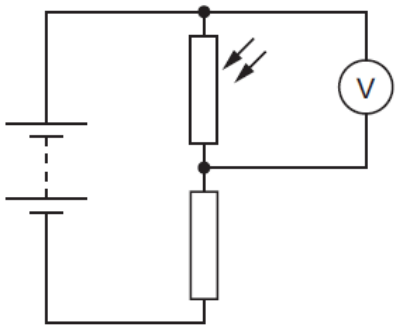
B $R_1 \times V_1 = R_2 \times V_2$

C $\frac{R_1}{R_2} = V_1 \times V_2$

D $\frac{R_1}{R_2} = \frac{V_1}{V_2}$

29. Nov/2023/Paper_ 0625/23/No.30

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



The brightness of the light falling on the LDR is increased.

Which row shows what happens to the resistance of the LDR and what happens to the reading on the voltmeter?

	resistance of LDR	reading on voltmeter
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

30. Nov/2023/Paper_ 0625/23/No.31

A simple a.c. generator has a coil rotating in a magnetic field.

What happens to the peak electromotive force (e.m.f.) and to the frequency of the a.c. output when the coil is rotated faster?

	peak e.m.f.	frequency
A	greater	greater
B	greater	no change
C	no change	greater
D	no change	no change

31. Nov/2023/Paper_ 0625/31/No.6(b)

Fig. 6.1 shows four wind turbines.

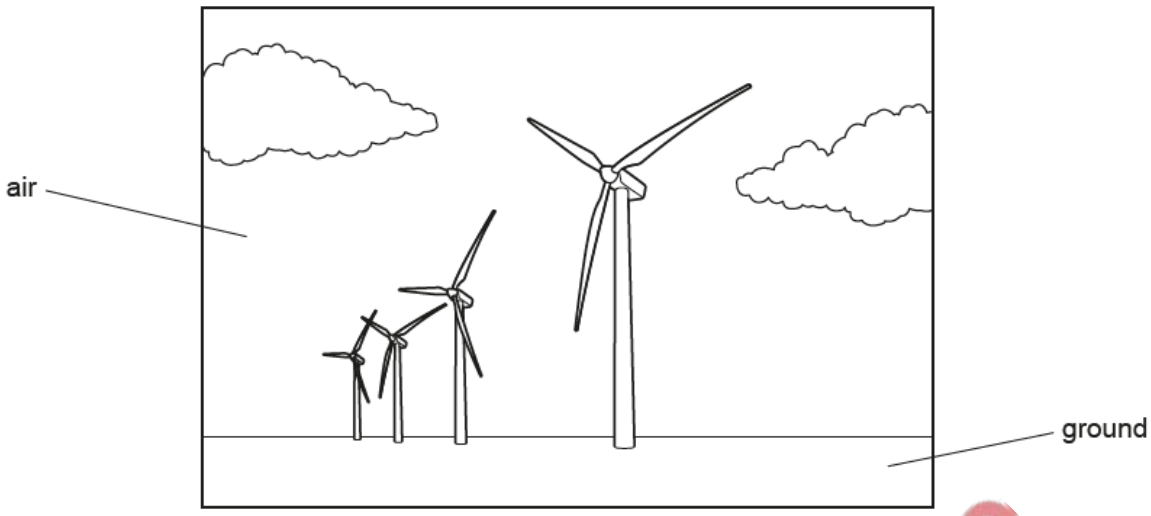


Fig. 6.1

(b) The electrical power output of a wind turbine is 624 kW. The output current is 520 A.

Calculate the output voltage of the wind turbine.

output voltage = ... V [4]

32. Nov/2023/Paper_ 0625/31/No.8

Fig. 8.1 shows a solenoid (long coil of wire) connected in a circuit. When the switch is closed, there is a large current in the circuit.

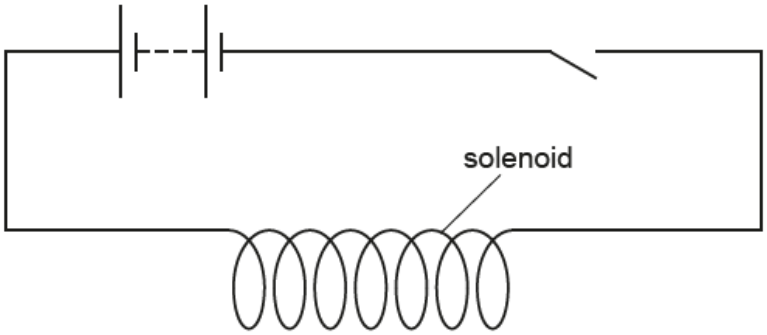


Fig. 8.1

(a) Describe an experiment to identify the pattern **and** direction of the magnetic field around the solenoid.

You may draw on Fig. 8.1 as part of your description.

.....

.....

..... [3]

(b) A solenoid P is placed close to another solenoid Q. Solenoid Q is connected to a sensitive voltmeter.
The arrangement is shown in Fig. 8.2.

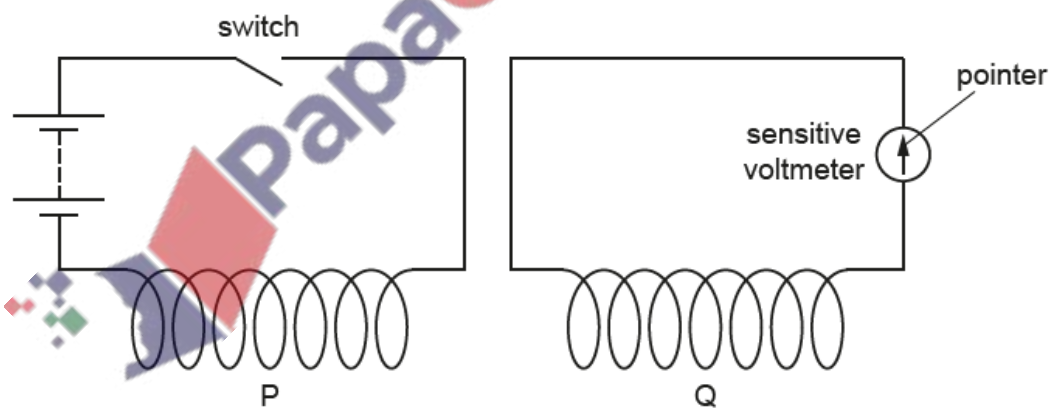


Fig. 8.2

Describe and explain what happens when the switch is closed.

.....

.....

.....

..... [4]

[Total: 7]

33. Nov/2023/Paper_ 0625/31/No.9

A student investigates an electric circuit. Fig. 9.1 shows the student's circuit.

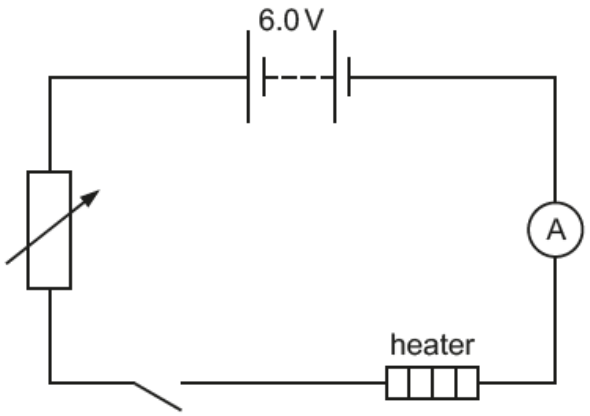


Fig. 9.1

(a) (i) Describe the purpose of the variable resistor in Fig. 9.1.

.....

..... [1]

(ii) The student uses cells with an electromotive force (e.m.f.) of 1.5 V.

Determine the number of cells needed for the 6.0 V battery in Fig. 9.1.

number of cells needed = ... [1]

(iii) The student connects another component to measure the potential difference (p.d.) across the heater.

On Fig. 9.1, draw the electrical symbol and connections for this component. [2]

(b) The p.d. across the heater is 4.0 V. The current in the heater is 1.6 A.

Calculate the energy transferred electrically by the heater in 40 s.

energy transferred = ... J [3]

[Total: 7]

34. Nov/2023/Paper_ 0625/32/No.9

Fig. 9.1 shows an electric water heater. The heater is connected to the mains electrical supply.

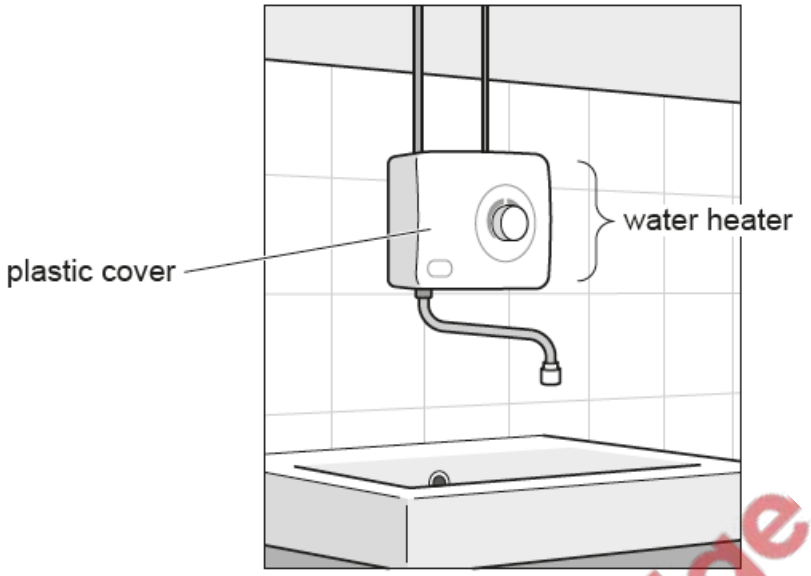


Fig. 9.1

Fig. 9.2 shows the electrical safety label for the heater.

Water Heater Model xxxxxx1
230 V (volts)
720 W (watts)
Disconnect from the mains supply before removing the plastic cover.

Fig. 9.2

(a) (i) Explain why the safety label states, 'Disconnect from the mains supply before removing the plastic cover.'

.....

..... [1]

(ii) The heater is switched on.

Calculate the current in the heater. Use the information in Fig. 9.2.

current = ... A [3]

(b) Table 9.1 shows some electrical meter readings for the water heater.

Table 9.1

date	meter reading / kW h
1st October	3771
31st October	3797

Electrical energy costs 18 cents per kW h.

Calculate the cost of using the heater from 1st October until 31st October.

cost = ... cents [3]

[Total: 7]

35. Nov/2023/Paper_ 0625/33/No.7

Two identical resistors, R_1 and R_2, are connected to a 24 V battery, as shown in Fig. 7.1.

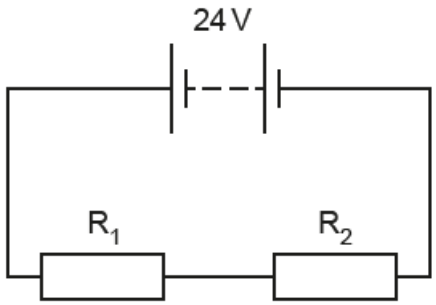


Fig. 7.1

The value of each resistor is 50 Ω.

(a) Calculate the combined resistance of R_1 and R_2 when they are connected as shown in Fig. 7.1.

combined resistance = ... Ω [1]

(b) Show that the current in the circuit is approximately 0.25 A.

[3]

(c) Determine the potential difference (p.d.) across R_1.

p.d. = ... V [1]

(d) Calculate the power transferred in R_1.

power = ... W [3]

(e) A student connects R_1, R_2 and the battery to make a different circuit. The resistors R_1 and R_2 are connected so their combined resistance is as small as possible.

Draw a circuit diagram to show how R_1 and R_2 are connected to the battery.

[1]

[Total: 9]

36. Nov/2023/Paper_ 0625/41/No.8

A cylinder is made of modelling clay. The modelling clay is an electrical conductor.

Fig. 8.1 shows the cylinder.

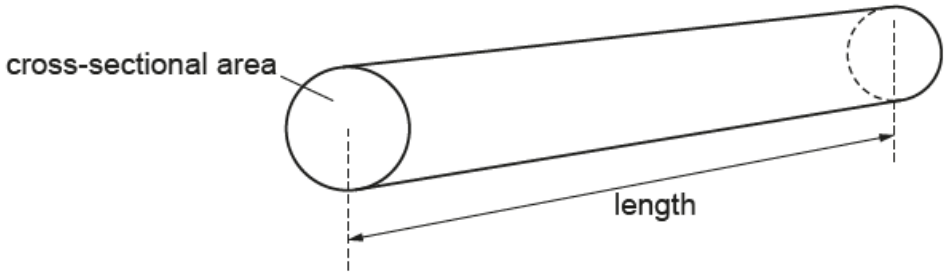


Fig. 8.1

The cylinder is connected into a circuit.

Fig. 8.2 shows that the circuit also includes a battery of electromotive force (e.m.f.) 9.0 V and a resistor P.

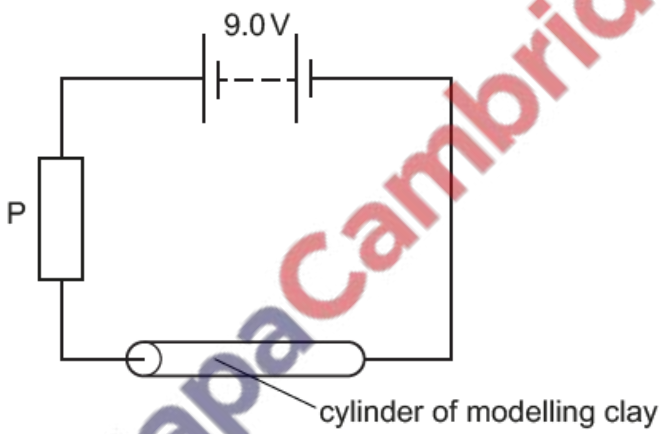


Fig. 8.2

The resistance of P is 4.0 Ω. The current in P is 1.5A.

(a) Calculate:

(i) the magnitude *X* of the charge that flows through P in 600 s

X = ... [2]

(ii) the resistance of the cylinder of modelling clay.

resistance = ... [3]

(b) The cylinder is removed from the circuit and replaced with a new cylinder made of the same modelling clay.

The new cylinder is twice the length and has half the cross-sectional area of the first cylinder.

Calculate the time that it now takes for a charge of magnitude *X* to flow through resistor P.

time = ... [4]

[Total: 9]

37. Nov/2023/Paper_ 0625/42/No.6

Fig. 6.1 shows the circuit diagram for a flashlight (torch).

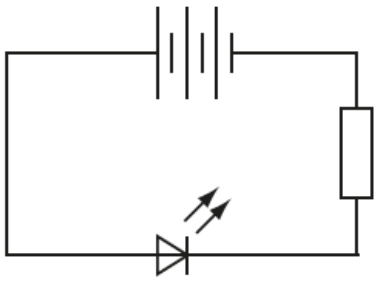


Fig. 6.1

The electromotive force (e.m.f.) of the battery is 4.5 V. The circuit contains a 60 Ω fixed resistor. The current in the light-emitting diode (LED) is 0.020 A.

(a) Calculate the potential difference (p.d.) across the LED.

p.d. = ... [2]

(b) Explain why the LED does **not** light up if the battery is reversed.

.....

..... [1]

(c) The chemical energy stored in the battery is 1050 J.

Show that the flashlight operates for approximately 3 h.

[2]

(d) Calculate the total charge that flows through the LED in 3600 s.

charge = ... [2]

[Total: 7]

38. Nov/2023/Paper_ 0625/43/No.6

(a) On Fig. 6.1, sketch the current–voltage graph of a filament lamp and explain its shape.

Fig. 6.1

explanation .....

.....

[3]

(b) Fig. 6.2 shows an electric circuit.

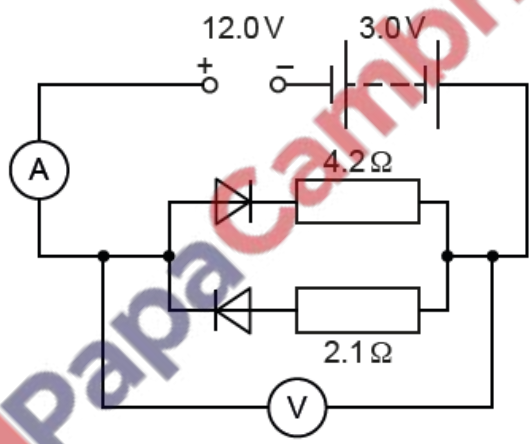


Fig. 6.2

(i) Calculate the reading on the voltmeter.

voltmeter reading = ... [2]

(ii) Calculate the current in the 4.2 Ω resistor.

current = ... [2]

(iii) Determine the current in the 2.1 Ω resistor.

current = ... [1]

(iv) Determine the reading on the ammeter.

ammeter reading = ... [1]

(v) Calculate the electrical power transferred in the 4.2 Ω resistor.

power = ... [2]

[Total: 11]

39. June/2023/Paper_0625/11/No.25

Which particles move to cause a current in a copper wire?

A copper atoms

B electrons from the copper atoms

C protons from the copper nuclei

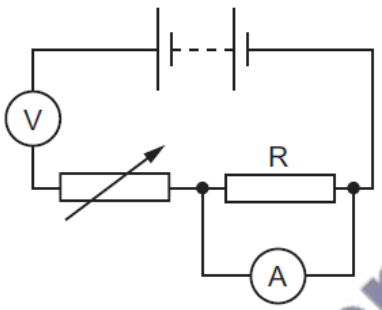
D neutrons from the copper nuclei

40. June/2023/Paper_0625/11/No.26

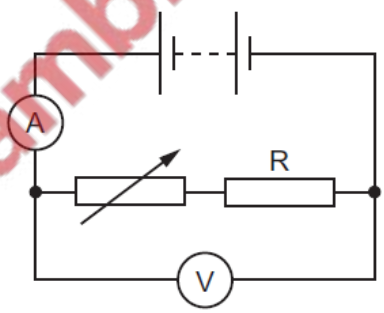
Four students draw a circuit diagram of the apparatus used to measure the resistance of resistor R.

Which circuit is correct?

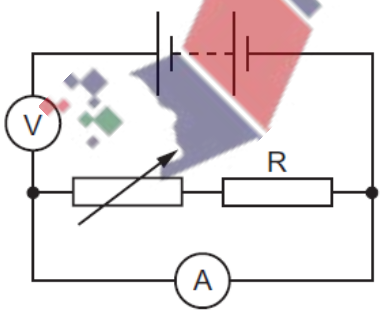
A



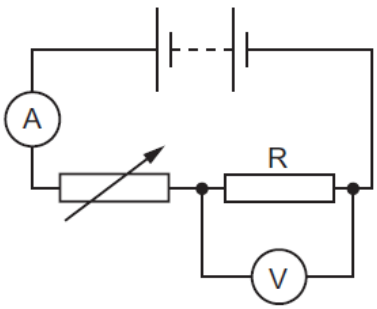
B



C



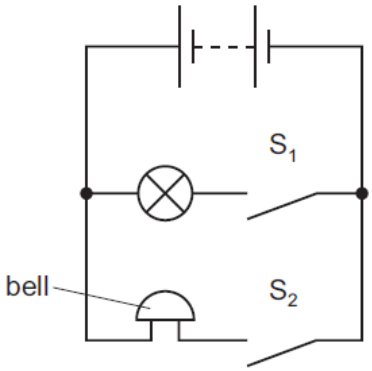
D



41. June/2023/Paper_0625/11/No.27

The battery on a bicycle is connected in parallel to its lamp and bell.

The circuit includes two switches, S_1 and S_2.



The cyclist closes S_1 to light the lamp.

She then also closes S_2 to sound the bell.

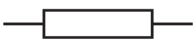
What happens to the current in the battery and the power output from the battery when the cyclist closes S_2?

	current in the battery	power output from the battery
A	increases	increases
B	increases	stays the same
C	stays the same	increases
D	stays the same	stays the same

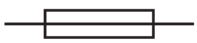
42. June/2023/Paper_0625/11/No.28

Which symbol represents an electric heater?

A

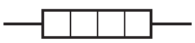


B



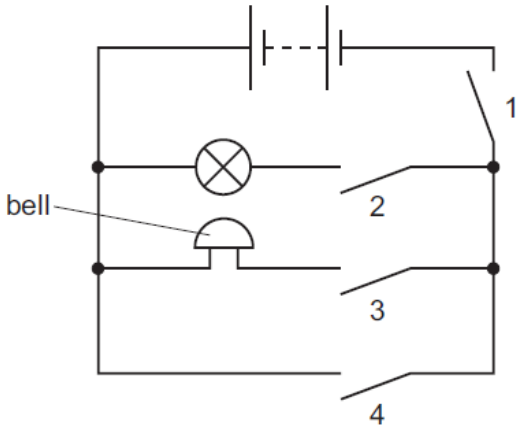
C

D



43. June/2023/Paper_0625/11/No.29

A student connects the circuit shown.



Which switches must be closed for the bell to ring without lighting the lamp?

A 1 and 2 only **B** 1 and 3 only **C** 1, 3 and 4 **D** 2, 3 and 4

44. June/2023/Paper_0625/11/No.30

A double-insulated electrical appliance must be connected safely to the electricity supply.

Which statement is correct?

A It must be connected with a fuse and an earth wire.

B It can be connected with a fuse only.

C It can be connected with an earth wire only.

D It does not need a fuse or an earth wire.

45. June/2023/Paper_0625/12/No.25

Which statement about electric current in a conductor is correct?

A In a d.c. circuit, the electric current gradually decreases along the conductor.

B In a d.c. circuit, the free electrons flow back and forth.

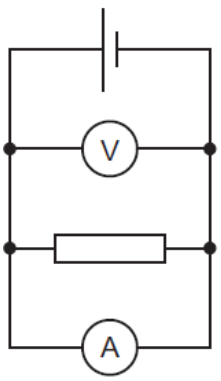
C In an a.c. circuit, the electric current remains exactly the same all the time.

D In an a.c. circuit, the flow of charge changes direction continually.

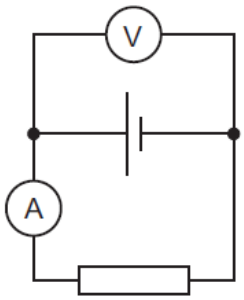
46. June/2023/Paper_0625/12/No.26

Which circuit can be used to measure the resistance of a resistor?

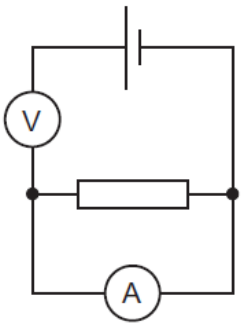
A



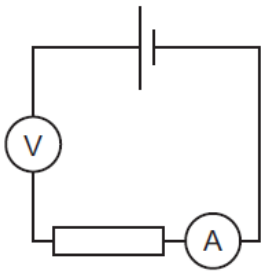
B



C



D



47. June/2023/Paper_0625/12/No.27

A lamp rated 12 V, 2.0 A is switched on for 60 s.

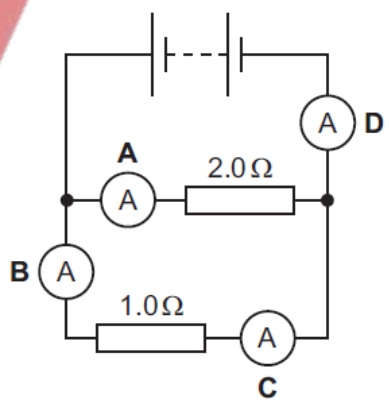
How much energy is transferred?

A 0.40 J **B** 10 J **C** 360 J **D** 1400 J

48. June/2023/Paper_0625/12/No.28

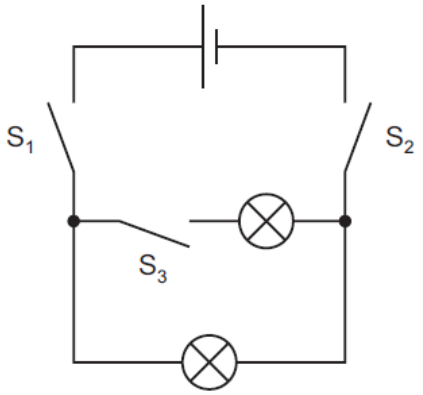
The circuit diagram shows a battery connected to two resistors. Four labelled ammeters are connected into the circuit.

Which ammeter shows the largest reading?



49. June/2023/Paper_0625/12/No.29

Two lamps are connected in parallel.



Which switches must be closed so that both lamps light?

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

50. June/2023/Paper_0625/13/No.25

A power supply of electromotive force (e.m.f.) 12 V is connected across a 3 Ω resistor.

Which ammeter is most suitable to measure the current in the resistor?

A an ammeter with a range 0–0.5 A

B an ammeter with a range 0–1 A

C an ammeter with a range 0–5 A

D an ammeter with a range 0–50 A

51. June/2023/Paper_0625/13/No.26

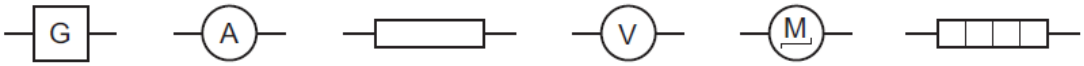
The cost of electrical energy is $0.25 for each unit of 1 kW h. A 2200 W heater is switched on for 48 minutes.

What is the cost of this use?

A $0.44 **B** $0.55 **C** $26 **D** $440

52. June/2023/Paper_0625/13/No.27

The diagram shows six different electrical circuit components.



Which circuit symbol is **not** present in the diagram?

A resistor

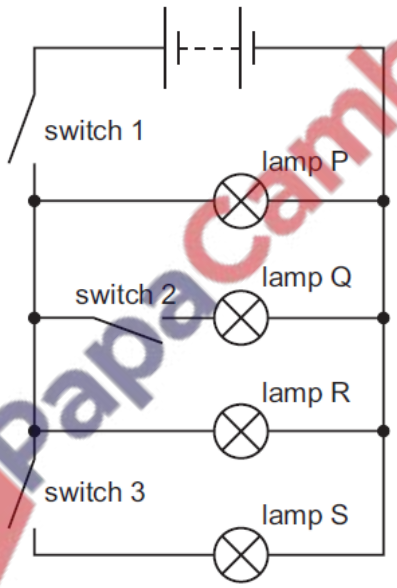
B voltmeter

C generator

D thermistor

53. June/2023/Paper_0625/13/No.28

The circuit shown contains three switches and four lamps P, Q, R and S.



Which switches must be closed to light only lamps P and R?

A switch 1 only

B switch 1 and switch 2

C switch 1 and switch 3

D switch 2 and switch 3

54. June/2023/Paper_0625/13/No.29

An electric heater has a metal frame.

The heating element is connected to the live and neutral wires of an a.c. supply. The metal frame is connected to the earth wire.

Which row gives the correct connections for the fuse and the switch?

	fuse	switch
A	in the earth	in the live
B	in the earth	in the neutral
C	in the live	in the live
D	in the live	in the neutral

55. June/2023/Paper_0625/21/No.25

A wire has a uniform circular cross-sectional area.

Which statement is correct?

A The resistance of the wire is directly proportional to its cross-sectional area and inversely proportional to its diameter.

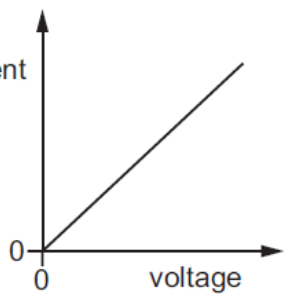
B The resistance of the wire is directly proportional to its cross-sectional area and inversely proportional to its length.

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

D The resistance of the wire is directly proportional to its length and inversely proportional to its diameter.

56. June/2023/Paper_0625/21/No.26

The diagram shows the current–voltage graph for a metal wire.



What can be deduced from the graph?

A As voltage increases, the temperature of the wire increases.

B As voltage increases, the temperature of the wire decreases.

C As voltage increases, the resistance of the wire increases.

D As voltage increases, the resistance of the wire remains constant.

57. June/2023/Paper_0625/21/No.27

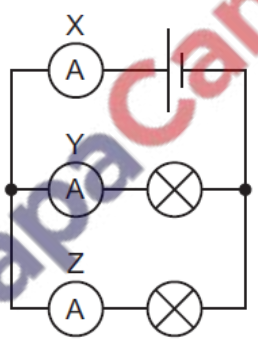
A battery is connected to a circuit. It is switched on for 1.0 minute. During that time, there is a current of 0.40 A in the circuit and the battery supplies a total of 48 J of energy.

Which row gives the charge that passes and the electromotive force (e.m.f.) of the battery?

	charge that passes in 1.0 minute / C	e.m.f. of the battery / V
A	0.40	2.0
B	0.40	120
C	24	2.0
D	24	120

58. June/2023/Paper_0625/21/No.28

The circuit diagram shows two identical lamps connected in parallel to a cell. Three ammeters, X, Y and Z, are also connected in the circuit, as shown.



Which statement about the current in X is correct?

A It is equal to the current in Y and to the current in Z.

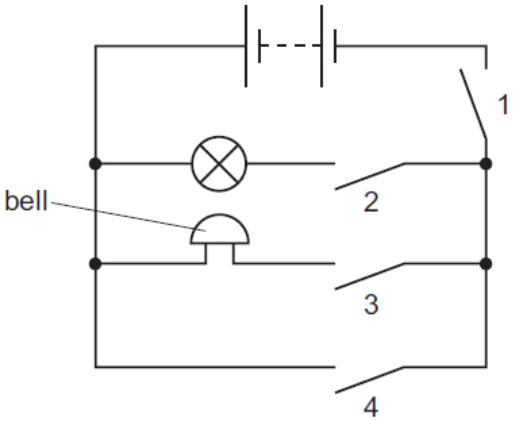
B It is less than either the current in Y or the current in Z.

C It is equal to the sum of the current in Y and the current in Z.

D It is equal to the difference between the current in Y and the current in Z.

59. June/2023/Paper_0625/21/No.29

A student connects the circuit shown.



Which switches must be closed for the bell to ring without lighting the lamp?

A 1 and 2 only **B** 1 and 3 only **C** 1, 3 and 4 **D** 2, 3 and 4

60. June/2023/Paper_0625/22/No.25

Which statement about electric current in a conductor is correct?

A In a d.c. circuit, the electric current gradually decreases along the conductor.

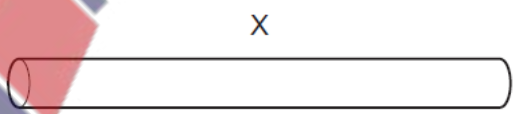
B In a d.c. circuit, the free electrons flow back and forth.

C In an a.c. circuit, the electric current remains exactly the same all the time.

D In an a.c. circuit, the flow of charge changes direction continually.

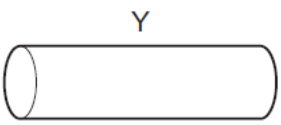
61. June/2023/Paper_0625/22/No.26

A piece of metal wire X with a uniform diameter has resistance R.



A second piece of wire Y is made of the same metal and has a uniform diameter.

Y has double the cross-sectional area of X and half the length of X.



What is the resistance of Y?

A $\frac{R}{4}$ **B** $\frac{R}{2}$ **C** R **D** $4R$

62. June/2023/Paper_0625/22/No.27

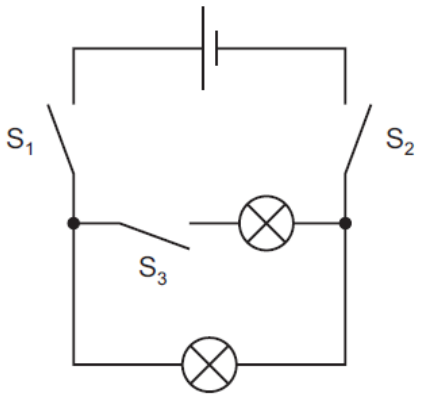
An electric fire is connected to a 240 V supply and transfers energy at a rate of 1.0 kW.

How much charge passes through the fire in 1.0 h?

A 42 C **B** 250 C **C** 1.5×10^4 C **D** 2.4×10^5 C

63. June/2023/Paper_0625/22/No.28

Two lamps are connected in parallel.



Which switches must be closed so that both lamps light?

A S_1 and S_2 only

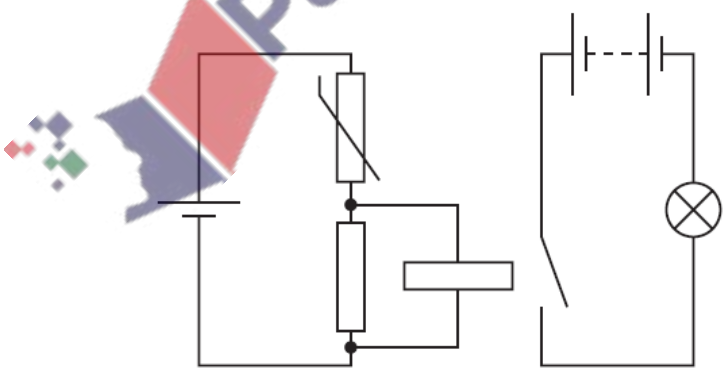
B S_1 and S_3 only

C S_2 and S_3 only

D S_1, S_2 and S_3

64. June/2023/Paper_0625/22/No.29

The diagram shows a circuit that switches on a lamp when there is a change in the environment.



Which change in the environment causes the lamp to be switched on?

A a decrease in light intensity

B a decrease in temperature

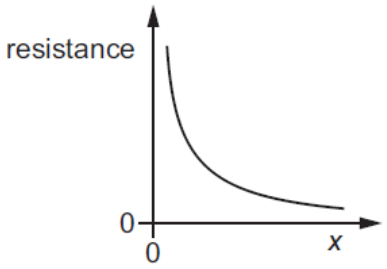
C an increase in light intensity

D an increase in temperature

65. June/2023/Paper_0625/23/No.25

A student does an experiment to investigate the resistance of a metal wire.

The graph shows the results from the experiment.



What is plotted on the *x*-axis?

A diameter of the wire

B length of the wire

C temperature of the wire

D current in the wire

66. June/2023/Paper_0625/23/No.26

The cost of electrical energy is \$0.25 for each unit of 1 kWh. A 2200 W heater is switched on for 48 minutes.

What is the cost of this use?

A \$0.44 **B** \$0.55 **C** \$26 **D** \$440

67. June/2023/Paper_0625/23/No.27

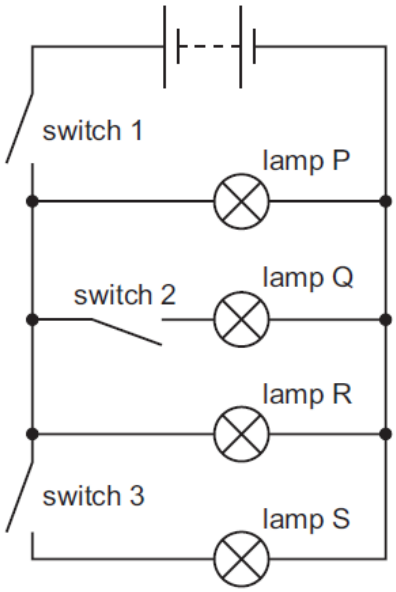
The table describes four different resistance wires. They are all made from the same metal.

Which wire has the smallest resistance?

	length of wire / m	diameter of wire / mm
A	2.0	1.0
B	2.0	1.5
C	3.0	1.0
D	3.0	1.5

68. June/2023/Paper_0625/23/No.28

The circuit shown contains three switches and four lamps P, Q, R and S.



Which switches must be closed to light only lamps P and R?

A switch 1 only

B switch 1 and switch 2

C switch 1 and switch 3

D switch 2 and switch 3

69. June/2023/Paper_0625/31/No.9

Fig. 9.1 shows a series circuit. Two of the components in the circuit are labelled.

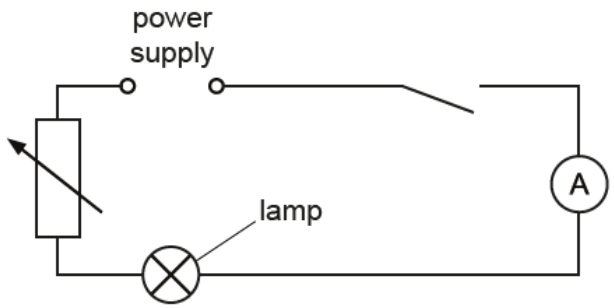


Fig. 9.1

(a) State the name of **two** other components in the circuit.

1 .....

2 .....
[2]

(b) The current in the lamp is 0.40A. The potential difference (p.d.) across the lamp is 6.0V.

Calculate the power dissipated in the lamp.

power = ... W [3]

(c) Draw on Fig. 9.1 to show a lamp connected in parallel with the lamp in the circuit. Use the correct symbol. [1]

[Total: 6]

70. June/2023/Paper_0625/32/No.8

A student uses the circuit in Fig. 8.1 to measure the resistance of the heater in the circuit.

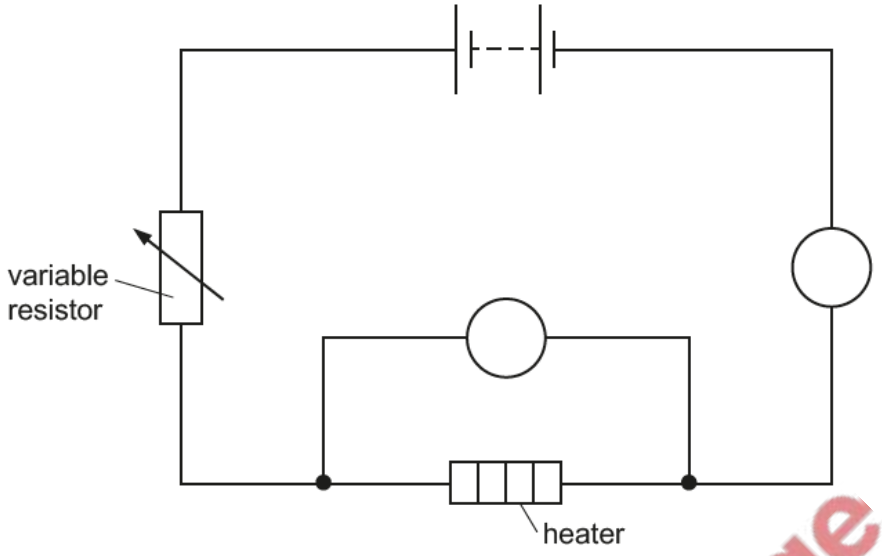


Fig. 8.1

(a) The symbols for the meters in Fig. 8.1 are incomplete.

Complete the symbols for the two meters by writing in the circles in Fig. 8.1. [2]

(b) The current in the heater is 1.4 A and the potential difference (p.d.) across the heater is 8.0 V.

Calculate the resistance of the heater.

resistance = ... Ω [3]

(c) The heater is switched on for 30 s. The current in the heater is 1.4 A and the p.d. across it is 8.0 V.

Calculate the electrical energy transferred by the heater during the 30 s.

energy transferred = ... J [3]

[Total: 8]

71. June/2023/Paper_0625/32/No.9(a)

A student has a desktop computer that connects to the 240 V a.c. mains electrical supply. Fig. 9.1 shows the desktop computer.

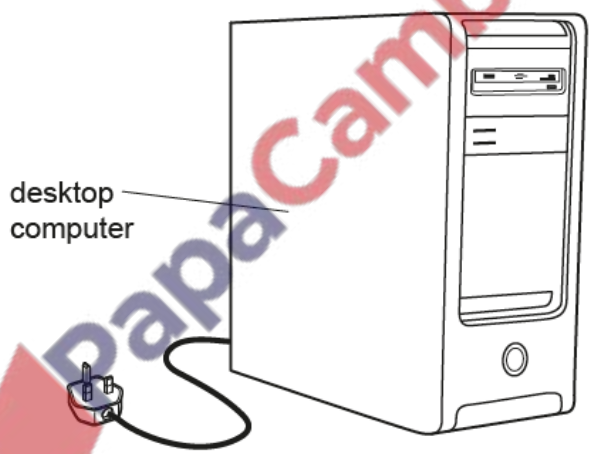


Fig. 9.1

(a) The desktop computer has an on-off switch in one of the wires that connect it to the mains supply.

State and explain which wire includes the switch.

.....

.....

..... [3]

72. June/2023/Paper_0625/41/No.7

(a) Students are investigating the refraction of light as it travels from air into glass.

Their task is to measure the angle of incidence and the angle of refraction at the surface of the glass block.

The students have the equipment shown in Fig. 7.1.

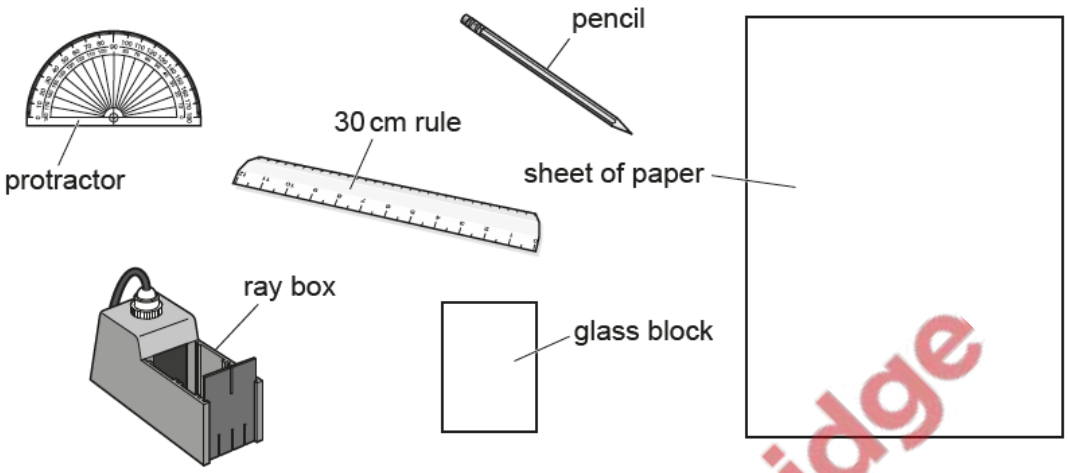


Fig. 7.1

Describe the method for the task.
You may draw a diagram as part of your answer.

.....

.....

.....

..... [4]

(b) Fig. 7.2 and Fig. 7.3 show two identical lenses, each forming an image. The images I_1 and I_2 have different characteristics.

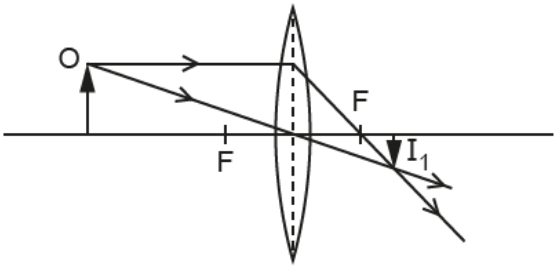


Fig. 7.2

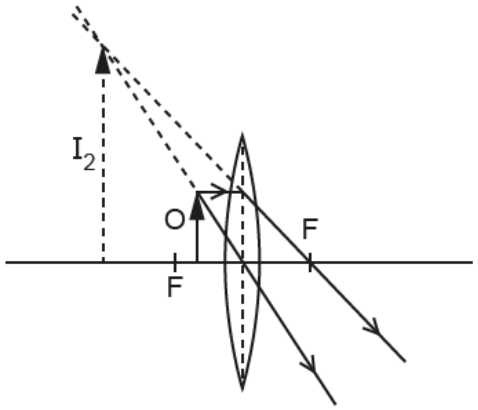


Fig. 7.3

One difference in the characteristics of the two images is:

Image I_1 is ..diminished.. but image I_2 is ..enlarged.. .

State **two** more differences in the characteristics of the images:

Image I_1 is ..... but image I_2 is ..... .

Image I_1 is ..... but image I_2 is ..... .

[3]

[Total: 7]

73. June/2023/Paper_0625/33/No.8

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

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

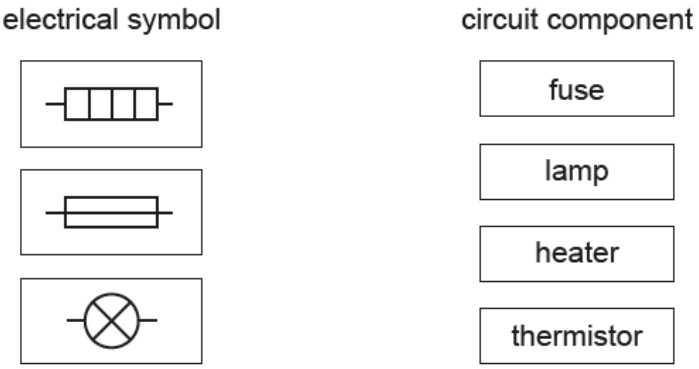


Fig. 8.1

[3]

(b) Fig. 8.2 shows a circuit including a battery, a fixed resistor R and an ammeter.

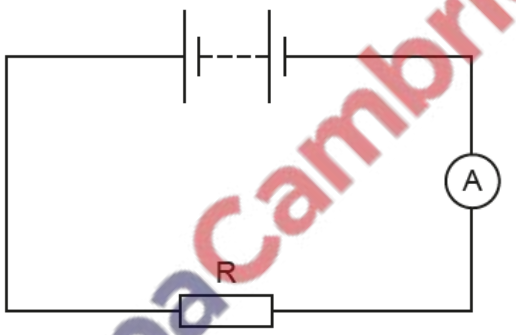


Fig. 8.2

The reading on the ammeter is 0.38A.
The potential difference across the fixed resistor R is 12V.

(i) Calculate the resistance of the fixed resistor R.

resistance = ... Ω [3]

(ii) Calculate the electrical power transferred in the fixed resistor R. Include the unit.

power transferred = ... unit ..... [4]

[Total: 10]

74. June/2023/Paper_0625/42/No.8(c)

(c) Fig. 8.2 shows a circuit.

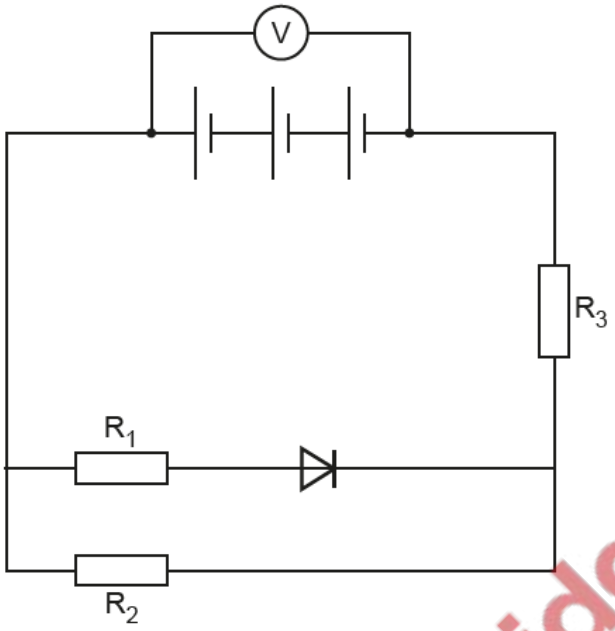


Fig. 8.2

The three cells are identical and have zero resistance.
The resistors R_1, R_2 and R_3 are identical.
The reading on the voltmeter is 6.0 V.
When the diode is conducting, it has zero resistance and zero potential difference (p.d.) across it.

(i) Determine the e.m.f. of one cell.

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

(ii) Determine the ratio of the p.d. across R_2 to the p.d. across R_3.

..... [1]

(iii) All the cells are reversed.

1. State and explain the change in current in R_1.

.....

..... [1]

2. Determine the new value of the ratio of the p.d. across R_2 to the p.d. across R_3.

..... [1]

75. June/2023/Paper_0625/43/No.6

An electric heater uses a resistance wire of resistance 26 Ω. The power dissipated in the resistance wire is 2500 W.

(a) Calculate the current in the resistance wire.

current = ... [3]

(b) The resistance wire of the heater has a length of 1.2 m and a cross-sectional area of $7.9 \times 10^{-7}\,m^2$.

A new heater is designed using wire of the same material with length 1.8 m and cross-sectional area $5.8 \times 10^{-7}\,m^2$.

Calculate the resistance of this wire.

resistance = ... [3]

(c) The 2500 W heater is used in a country where electricity costs 0.30 dollars per kilowatt-hour.

Calculate the cost of using the heater continuously for two days.

cost = ... dollars [2]

[Total: 8]