Sc!ence

Name: …… **( )**

Class: ……

Date: …… **/** …… **/** ……

Multiple-Choice Questions on Electricity – Answers

1. A student measures the potential difference across a device and the current in the device.

Which calculation gives the resistance of the device?

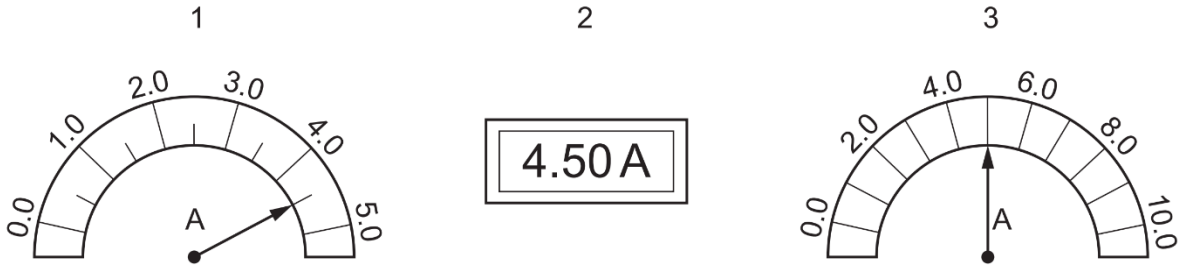
A current + potential difference

B current ÷ potential difference

C potential difference ÷ current

D potential difference × current

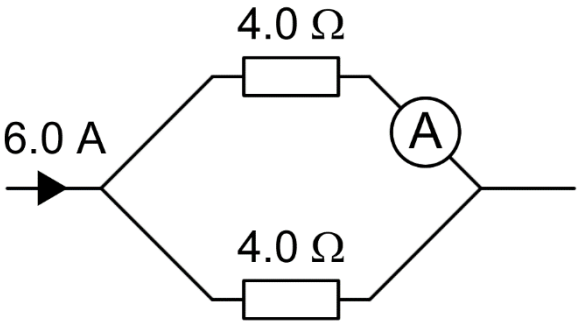
2. The diagram shows three ammeters.



Which ammeters show the same value of current?

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

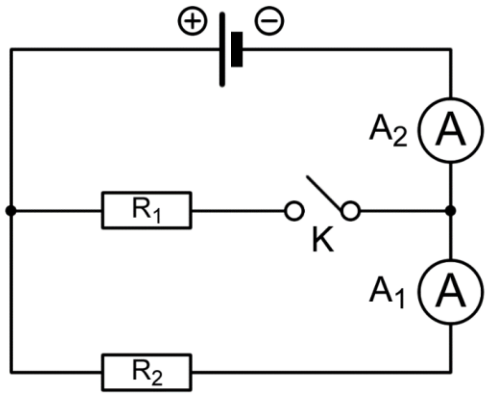
3. The diagram shows part of an electric circuit.



What is the reading on the ammeter?

A 6.0 A **B** 3.0 A **C** 1.5 A **D** 0.75 A

4. Two identical resistors are connected to a 15 V cell as shown in the circuit below.



Which of the following correctly describes the readings on the ammeters A_1 and A_2 when switch K is closed?

A A_2 has the same reading as A_1.

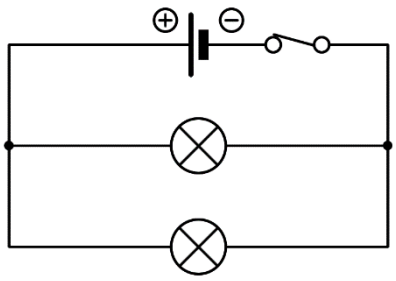
B A_2 has half the reading as A_1.

C A_2 has double the reading of A_1.

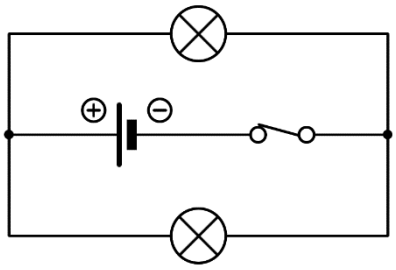
D A_1 has a zero reading while A_2 has a non-zero reading.

5. The following diagrams show two lamps, a switch and a battery connected in a circuit. Which one of the circuits is **not** equivalent to the other three circuits? Answer = **C**

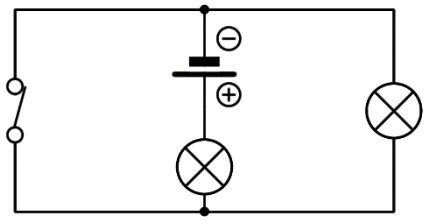
A



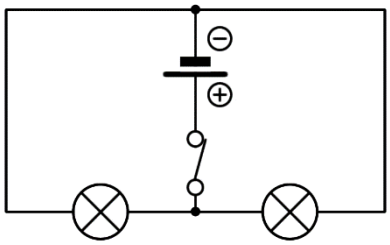
B



C

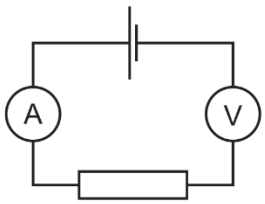


D

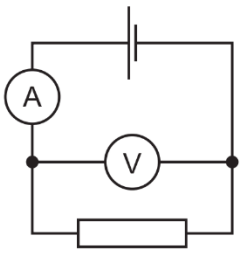


6. A voltmeter and an ammeter are used to measure the resistance of a resistor.
Which diagram shows the voltmeter and the ammeter correctly connected? Answer = **B**

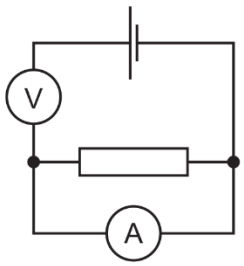
A



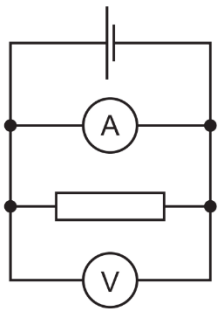
B



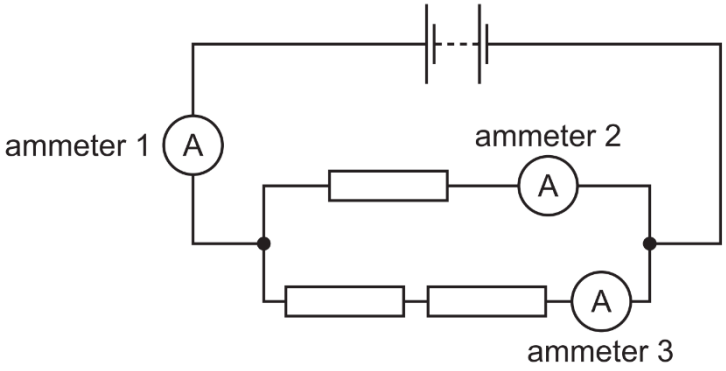
C



D



7. The diagram shows three identical resistors, three ammeters and a battery, connected in a circuit.



What is the order of the magnitudes of the readings on the ammeters from smallest to largest?

A ammeter 1 < ammeter 2 < ammeter 3

B ammeter 1 < ammeter 3 < ammeter 2

C ammeter 2 < ammeter 3 < ammeter 1

D ammeter 3 < ammeter 2 < ammeter 1

8. A lamp is connected across one cell, then across two cells. The potential difference (p.d.) across the lamp and the current in it are measured in each case.

The results are shown.

number of cells	p.d. / V	current / A
1	2.8	0.25
2	5.4	0.4

What is the change in the resistance of the lamp when the number of cells is increased from one to two?

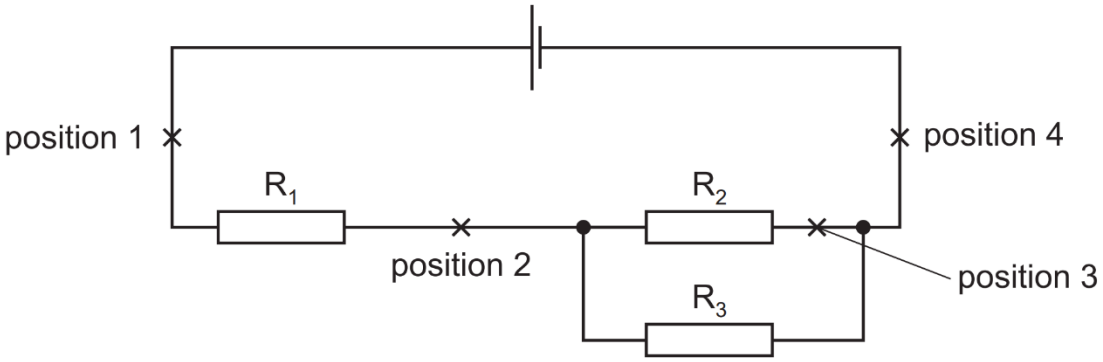
A It decreases by 0.015 Ω.

B It increases by 1.5 Ω.

C It increases by 2.3 Ω.

D It increases by 17 Ω.

9. The diagram shows a cell connected to three resistors, R_1, R_2 and R_3.

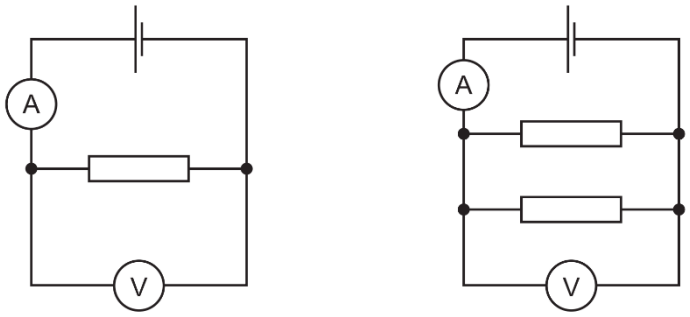


A student connects an ammeter first in position 1, then in position 2, 3 and 4 in turn.

In which position(s) does the ammeter show the current in R_1?

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

10. A student sets up a circuit which she calls circuit 1. She records the value of the current I_1, and calculates the resistance R_1 of the circuit.



circuit 1 circuit 2

She then connects an identical resistor in parallel with the original resistor. She calls this circuit 2.

She records current I_2 and calculates the total resistance R_2 of this circuit.

Which row correctly compares the two currents and the two resistances in the circuits?

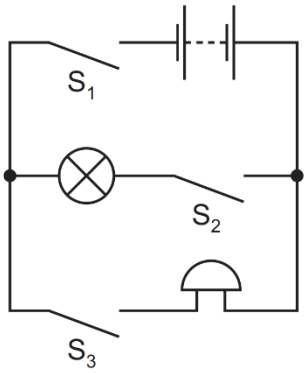
A I_2 is greater than I_1 and R_2 is greater than R_1.

B I_2 is greater than I_1 and R_2 is less than R_1.

C I_2 is less than I_1 and R_2 is greater than R_1.

D I_2 is less than I_1 and R_2 is less than R_1.

11. The diagram shows a circuit including a lamp, an electric bell and three switches S_1, S_2 and S_3. The lamp and bell are not faulty.



The bell is ringing but the lamp is not lit.

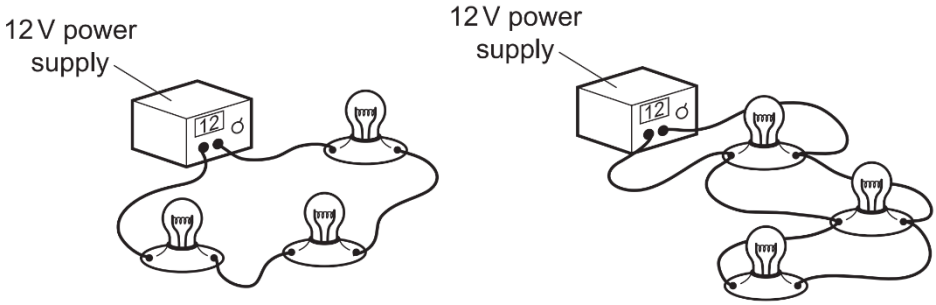
Which switches are closed?

A S_1 only **B** S_1 and S_2 only **C** S_1 and S_3 only **D** S_1, S_2 and S_3

12. A student is designing a lighting circuit for a dolls' house. She sets up two different circuits.

Each circuit contains a 12 V power supply and three identical lamps.

Each lamp is designed to operate at normal brightness when connected individually to a 12 V supply.



circuit 1 circuit 2

Which statement is correct?

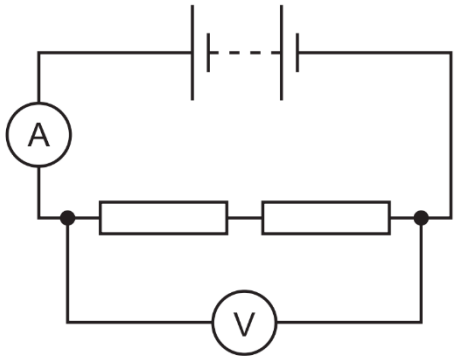
A In circuit 1, each of the lamps is at normal brightness.

B In circuit 1, if one lamp fails, the other lamps remain lit.

C In circuit 2, if one lamp fails, the other lamps remain lit.

D In circuit 2, the current from the power supply is less than in circuit 1.

13. A student uses the circuit shown to determine the resistance of two identical resistors.

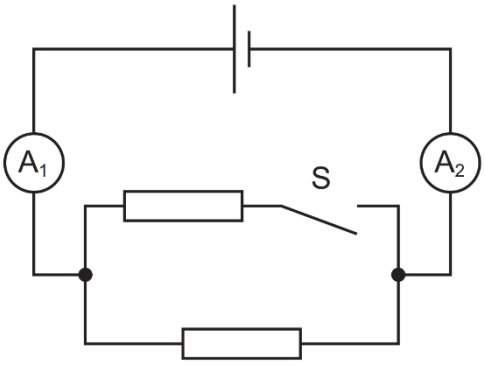


The voltmeter reading is 2.2 V and the ammeter reading is 0.25 A.

What is the resistance of each resistor?

A 0.275 Ω **B** 0.55 Ω **C** 4.4 Ω **D** 8.8 Ω

14. In the circuit shown, A_1 and A_2 are ammeters.

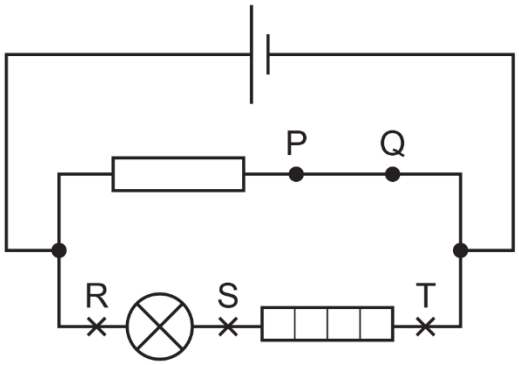


Switch S is closed.

Which row is correct?

	resistance of whole circuit	reading of A_1	reading A_2
A	decreases	same	increases
B	decreases	increases	increases
C	increases	same	same
D	increases	decreases	decreases

15. The diagram shows a circuit. The wire between P and Q can be removed and replaced by a circuit component.



Where should a voltmeter be connected to measure the potential difference (p.d.) across the lamp?

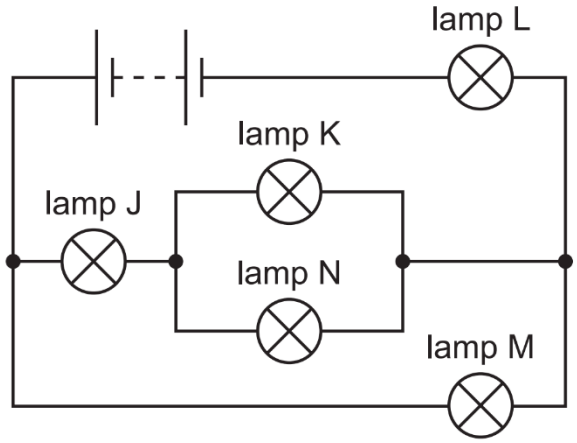
A between P and Q in place of the wire

B in parallel with R and S

C in parallel with R and T

D in parallel with S and T

16. The circuit shown contains five lamps J, K, L, M and N. All the lamps are glowing.

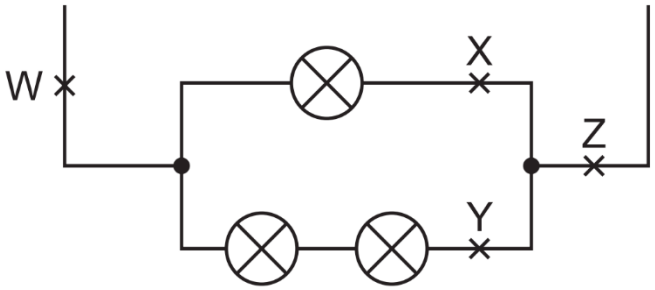


One lamp is removed and two other lamps go out.

Which lamp is removed?

A lamp J **B** lamp K **C** lamp L **D** lamp M

17. The diagram shows part of a circuit containing three identical lamps.



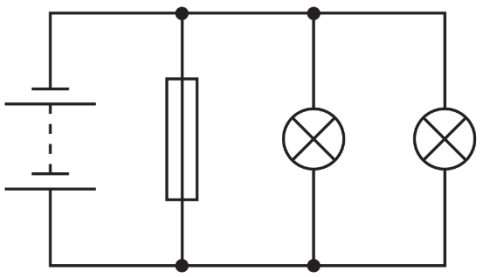
At which two points do the currents have the same value?

A W and X **B** W and Z **C** X and Y **D** Y and Z

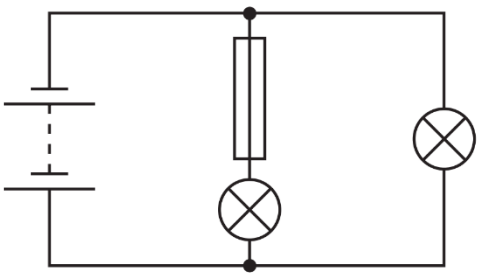
18. A student constructs four circuits, each containing a fuse. The fuse blows in one circuit and both lamps in the circuit go out.

In which circuit does the fuse blow and both lamps go out? Answer = **D**

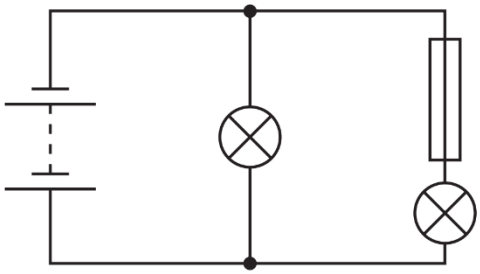
A



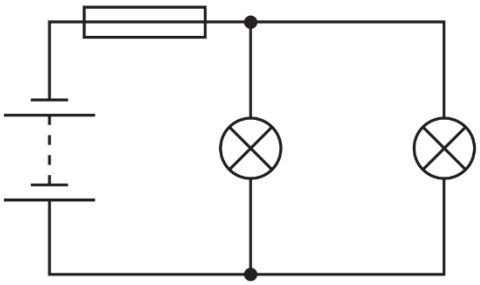
B



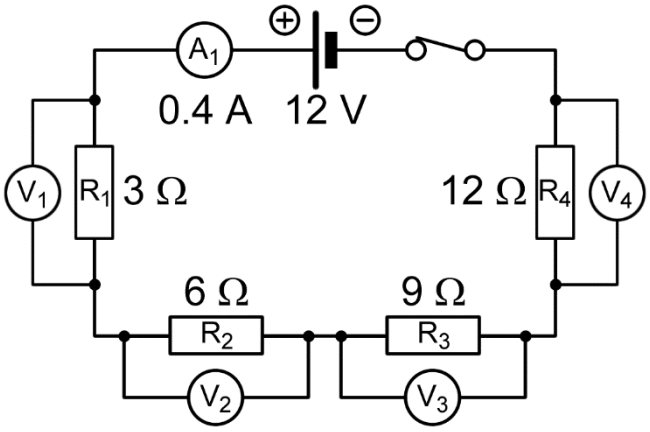
C



D



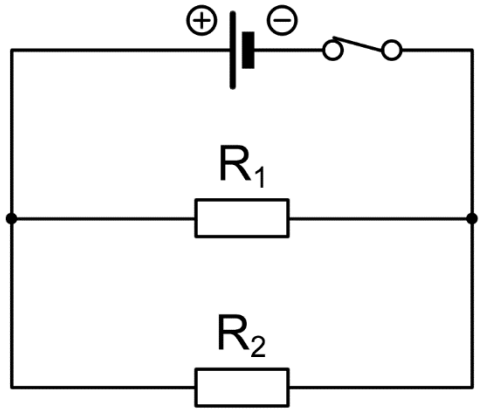
19. Study the circuit diagram given below.



Which resistor has a potential difference of 3.6 V across it?

A R_1 **B** R_2 **C** R_3 **D** R_4

20. Study the circuit diagram given below.



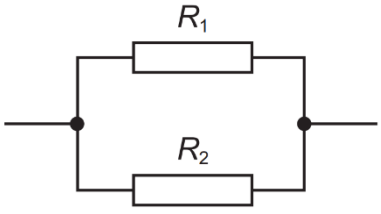
Which combination of values for R_1 and R_2 will give an effective resistance of 1.6 Ω?

A $R_1 = 2.0\ \Omega$, $R_2 = 4.0\ \Omega$ **B** $R_1 = 2.0\ \Omega$, $R_2 = 8.0\ \Omega$

C $R_1 = 4.0\ \Omega$, $R_2 = 4.0\ \Omega$ **D** $R_1 = 4.0\ \Omega$, $R_2 = 8.0\ \Omega$

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

The resistance R_1 is greater than the resistance R_2.



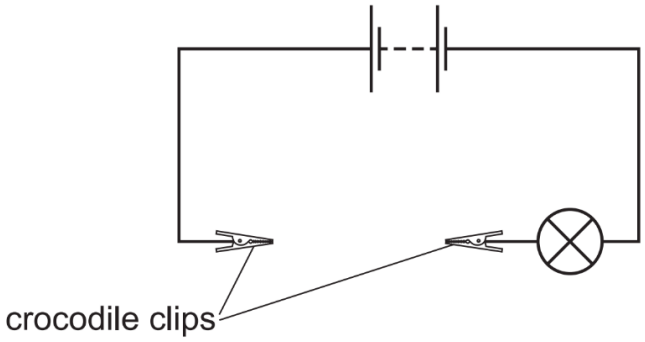
What is the resistance of the parallel combination?

A Less than either R_1 or R_2. **B** Equal to R_1.

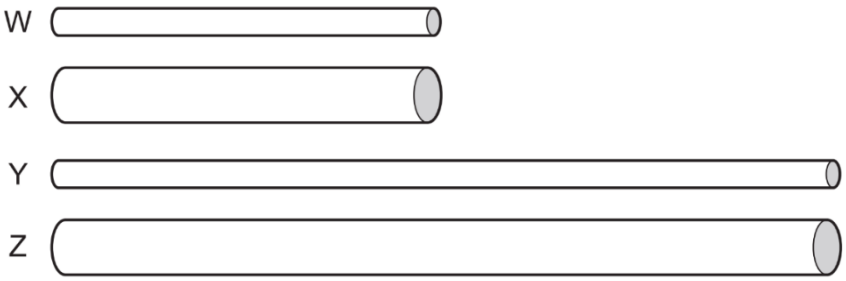
C Equal to R_2. **D** The average of R_1 and R_2.

22. A battery is connected to two crocodile clips and a lamp.

There is a gap between the crocodile clips.



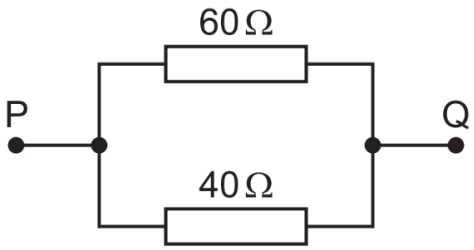
Four cylinders **W**, **X**, **Y** and **Z** are made of the same metal but have different dimensions. The cylinders are connected in turn, by their ends, between the crocodile clips. The diagrams of the cylinders are all drawn to the same scale.



Which cylinder makes the lamp glow most brightly and which cylinder makes the lamp glow least brightly?

	most brightly	least brightly
A	**W**	**Y**
B	**W**	**Z**
C	**X**	**Y**
D	**X**	**Z**

23. The diagram shows a 40 Ω resistor and a 60 Ω resistor connected in parallel.



What is the total resistance between points **P** and **Q**?

A Less than 40 Ω

B 50 Ω

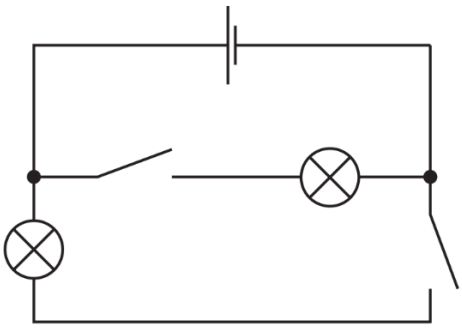
C Between 60 Ω and 100 Ω

D 100 Ω

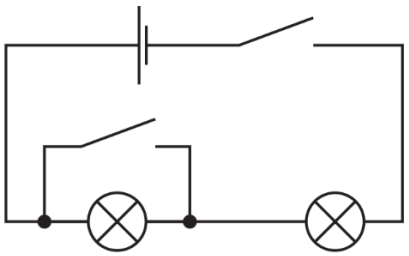
24. In which circuit can the lamps be switched on and switched off independently?

Answer = **A**

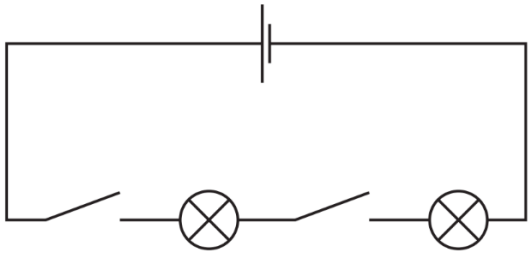
A



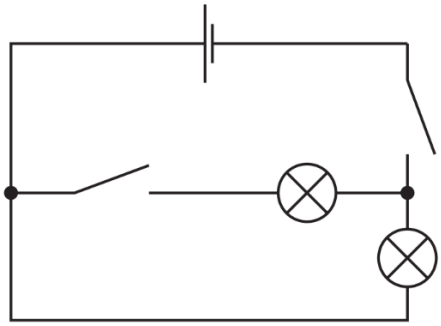
B



C



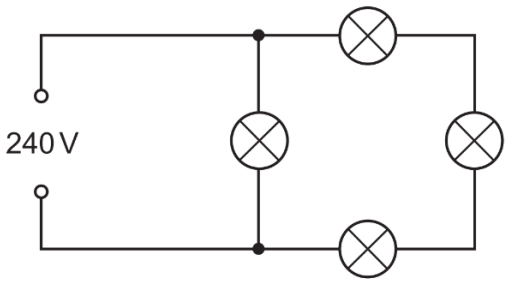
D



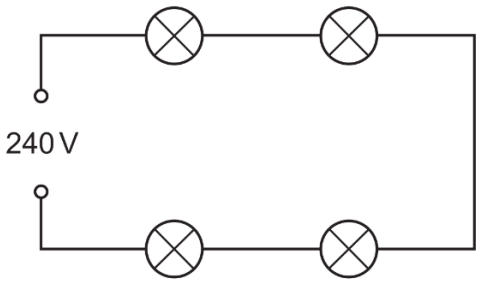
25. Four lamps are each labelled 240V.

In which circuit do all four lamps have normal brightness? Answer = **C**

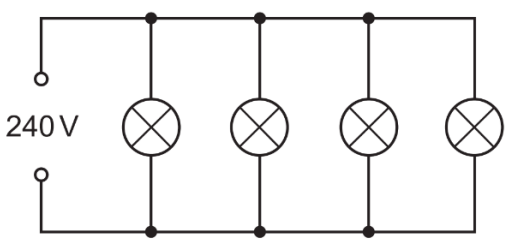
A



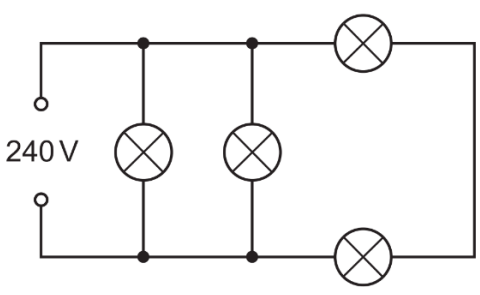
B



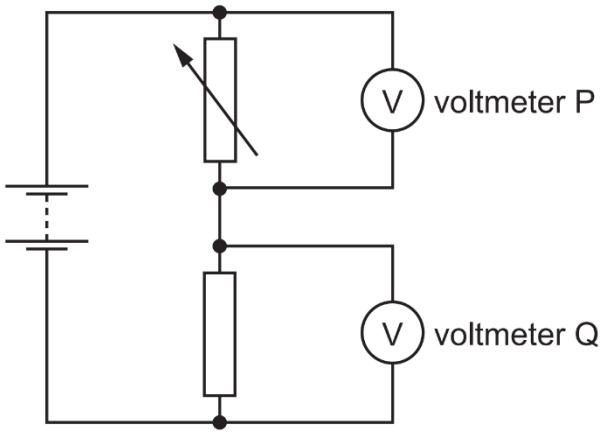
C



D



26. The diagram shows a potential divider connected to two voltmeters **P** and **Q**.

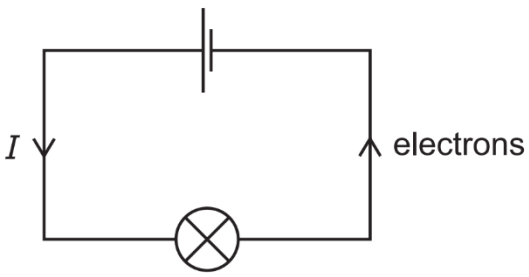


The resistance of the variable resistor is decreased.
Which row shows what happens to the reading on each voltmeter?

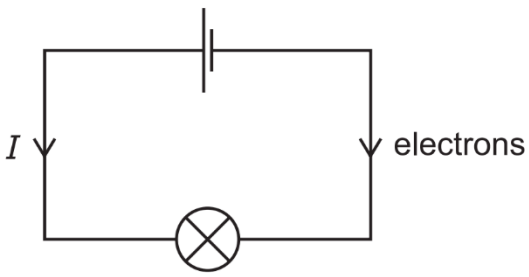
	reading on voltmeter **P**	reading on voltmeter **Q**
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	increases

27. Which circuit shows the directions of the conventional current I and the flow of electrons? Answer = **B**

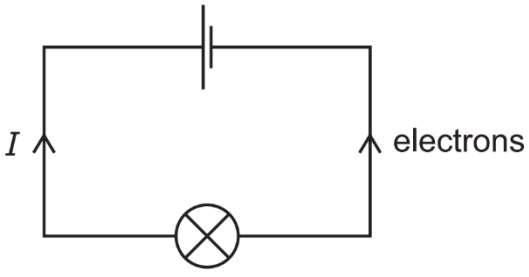
A



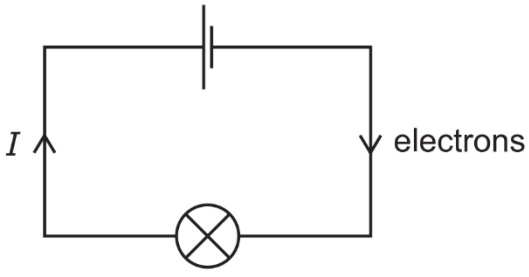
B



C

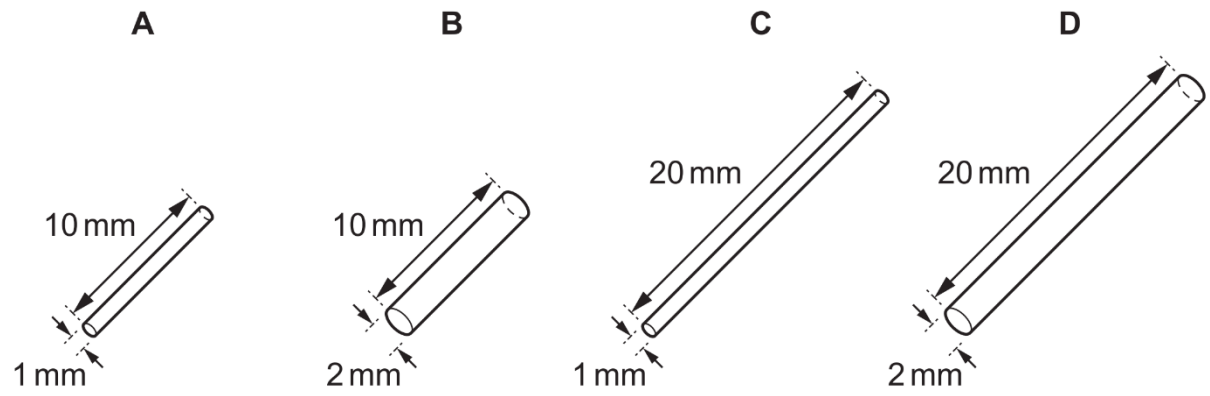


D



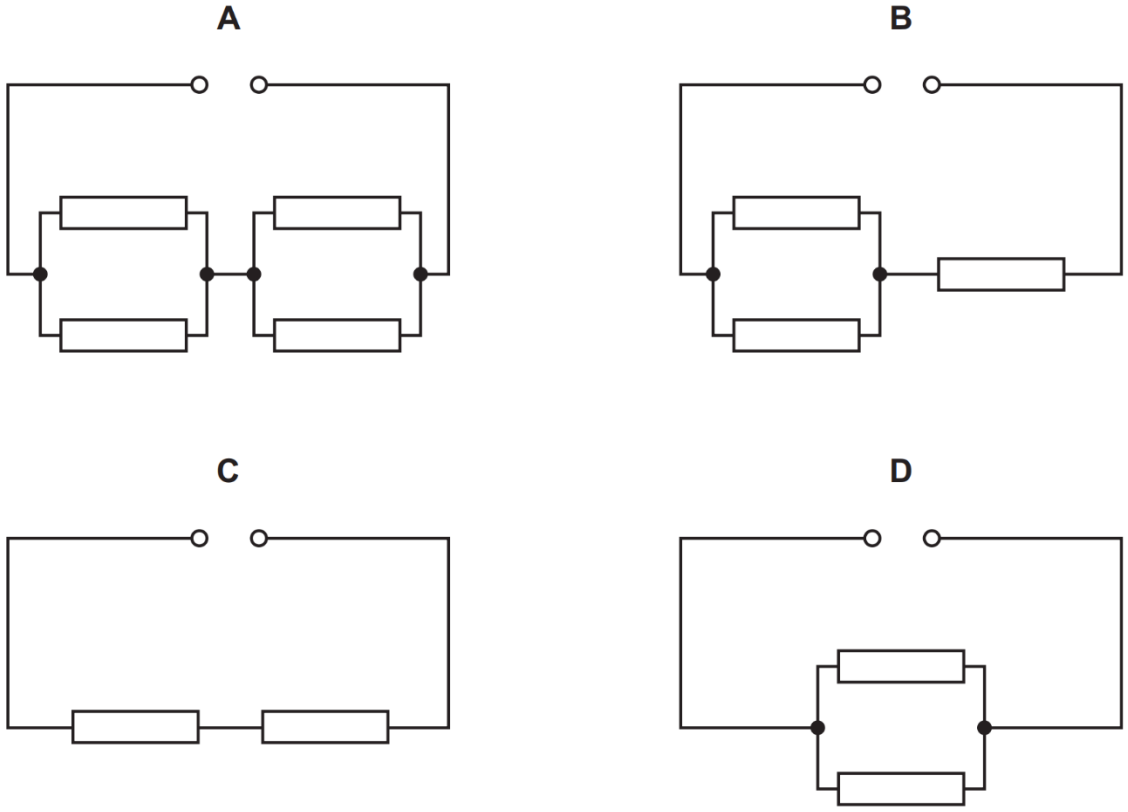
28. The diagrams represent four copper wires. Which wire has the greatest resistance?

Answer = **C**



29. In the circuits shown, each of the resistors has a resistance of 1.0 Ω.

Which circuit has the greatest resistance? Answer = **C**

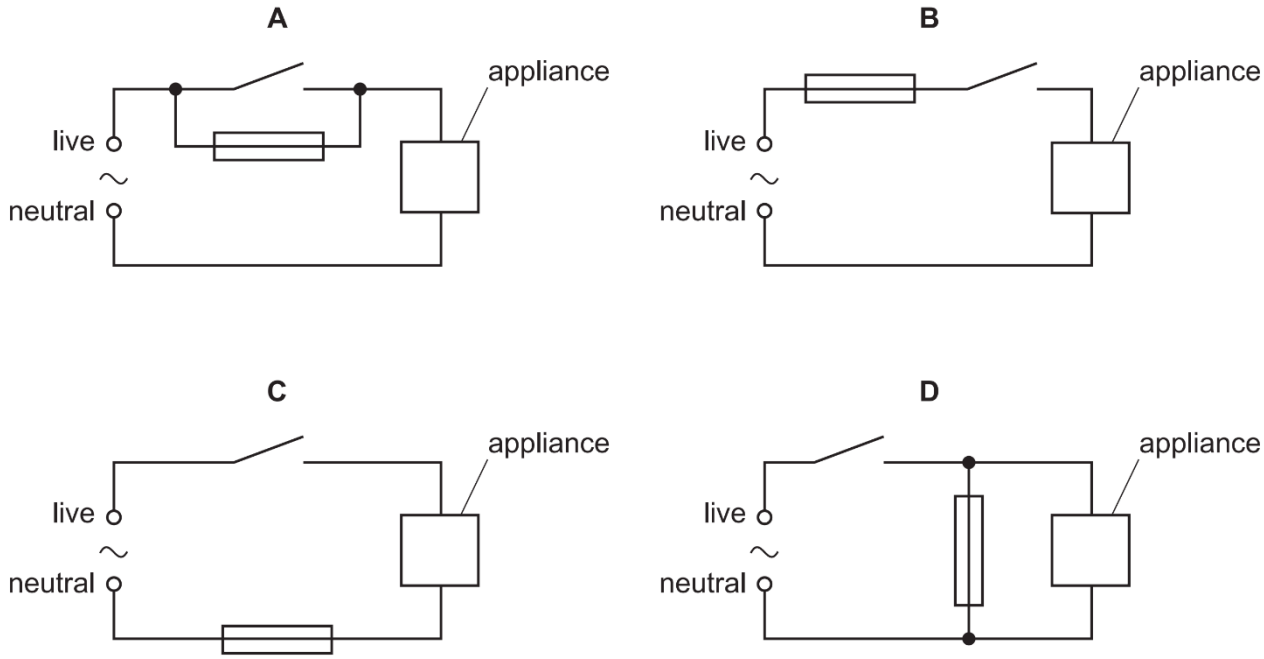


30. A 40 W lamp wastes 34 J of energy every second by heating its surroundings.

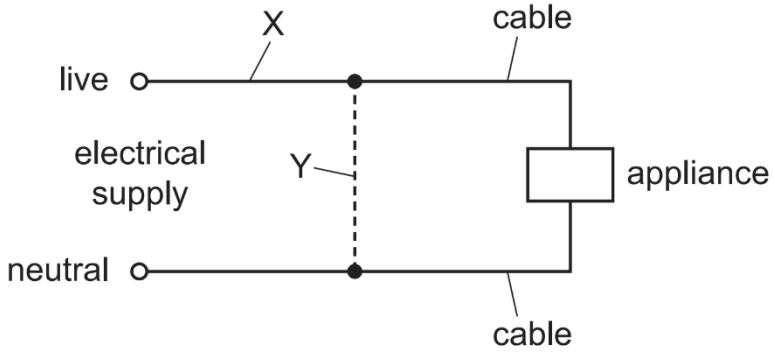
What is the efficiency of the lamp?

A 0.15% **B** 15% **C** 18% **D** 85%

31. An appliance is connected to a mains supply. Its circuit also contains a switch and a fuse. Which circuit shows the fuse in the correct position? Answer = **B**



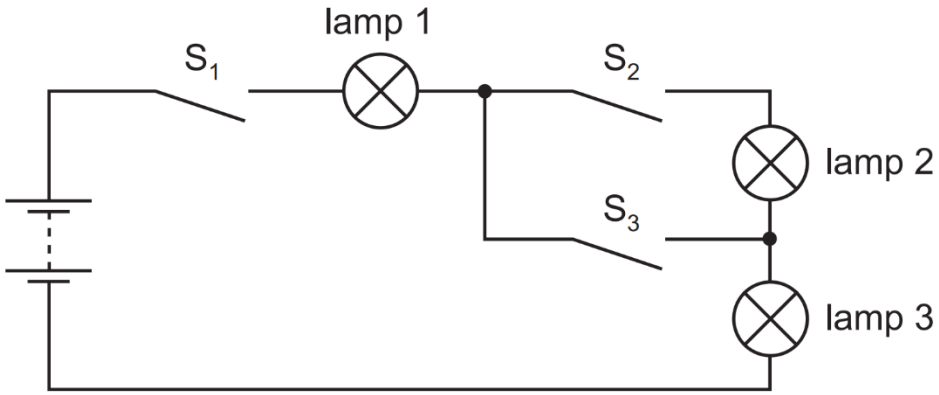
32. Either a fuse or a circuit-breaker can be used to protect electrical cables from large currents that could cause overheating.



When a fuse is used, where should it be connected, and when a circuit-breaker is used, where should it be connected?

	position of fuse	position of circuit breaker
A	**X**	**X**
B	**X**	**Y**
C	**Y**	**X**
D	**Y**	**Y**

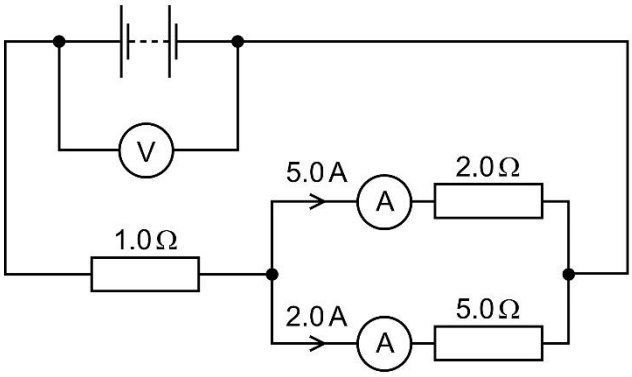
33. The diagram shows a circuit containing three lamps and three switches S_1, S_2 and S_3.



Lamp 1 and lamp 3 are lit, but lamp 2 is not lit. Which switch or switches is / are closed?

A S_1 only **B** S_1 and S_2 **C** S_1 and S_3 **D** S_2 and S_3

34. The circuit diagram shows a 1.0 Ω resistor connected in series with a parallel arrangement of a 2.0 Ω resistor and a 5.0 Ω resistor. The current readings for the parallel arrangement are shown.



What is the reading on the voltmeter?

A 10 V **B** 12 V **C** 15 V **D** 17 V

35. At which point in the circuit is the current the smallest? Answer = **D**