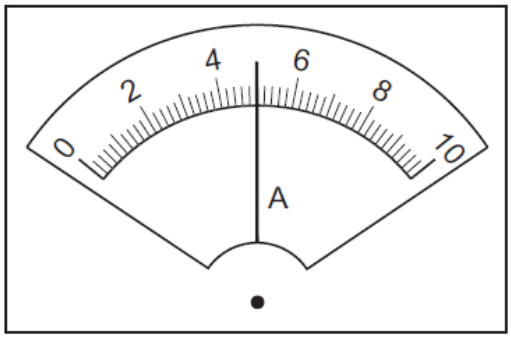
Electricity – 2020 IGCSE 0625

1. March/2020/Paper_12/No.30

The diagram shows a reading on an ammeter.



What is the reading?

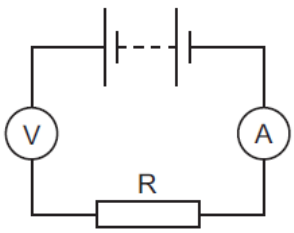
A 0.45 A **B** 0.50 A **C** 4.5 A **D** 5.0 A

2. March/2020/Paper_12/No.31

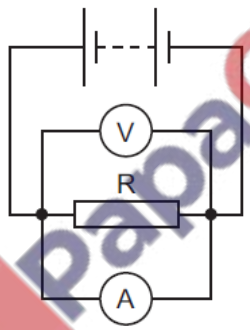
A student is to determine the resistance of resistor R. She uses a circuit including a voltmeter and an ammeter.

Which circuit should be used?

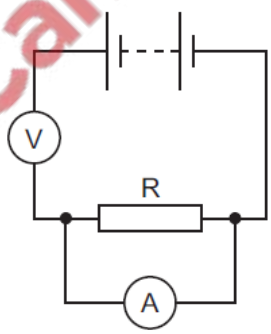
A



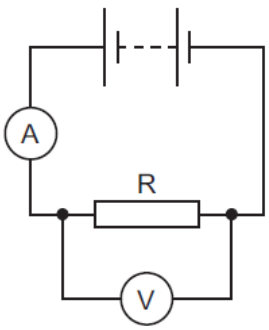
B



C



D



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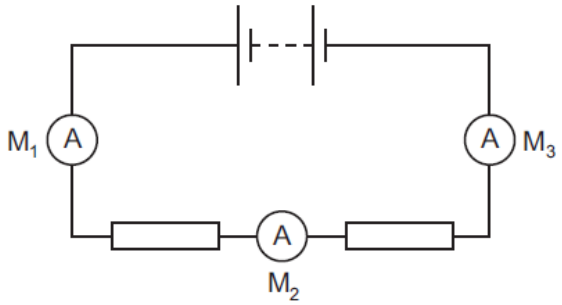
3. March/2020/Paper_12/No.32

The diagram shows a battery connected to two resistors. Three ammeters M_1, M_2 and M_3 are connected in the circuit.



Ammeter M_1 reads 1.0 A.

What are the readings on M_2 and on M_3?

	reading on M_2 / A	reading on M_3 / A
A	0.0	0.0
B	0.5	0.5
C	0.5	1.0
D	1.0	1.0

4. March/2020/Paper_12/No.33

Lamps in a circuit are connected in parallel.

What is the advantage of this?

A If one lamp breaks, the others remain lit.

B Less current is taken from the power supply.

C The lamps use less power than if they were connected in series.

D The potential difference across each lamp is less than that of the power supply.

5. March/2020/Paper_12/No.35

There is a 5 A fuse in the circuit of an appliance.

What is the purpose of the fuse and in which wire is it connected?

	purpose	wire in which it is connected
A	breaks the circuit if the current is greater than 5 A	earth
B	breaks the circuit if the current is greater than 5 A	live
C	breaks the circuit if the current is less than 5 A	earth
D	breaks the circuit if the current is less than 5 A	live

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6. March/2020/Paper_22/No.30

Which row describes conventional current and electron flow in a circuit containing a cell?

	conventional current	electron flow
A	from the negative terminal of the cell to the positive terminal of the cell	from the negative terminal of the cell to the positive terminal of the cell
B	from the negative terminal of the cell to the positive terminal of the cell	from the positive terminal of the cell to the negative terminal of the cell
C	from the positive terminal of the cell to the negative terminal of the cell	from the negative terminal of the cell to the positive terminal of the cell
D	from the positive terminal of the cell to the negative terminal of the cell	from the positive terminal of the cell to the negative terminal of the cell

7. March/2020/Paper_22/No.31

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

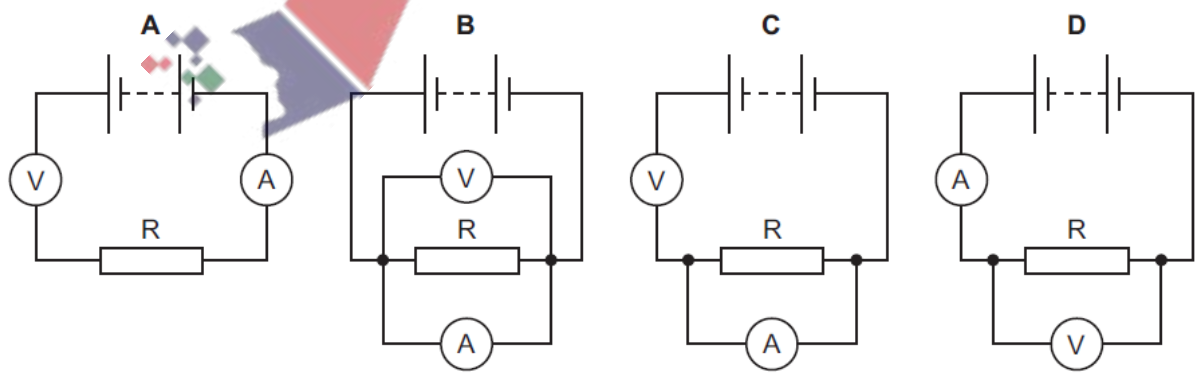
Which piece of wire will make the resistor with the largest resistance?

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

8. March/2020/Paper_22/No.32

A student is to determine the resistance of resistor R. She uses a circuit including a voltmeter and an ammeter.

Which circuit should be used?



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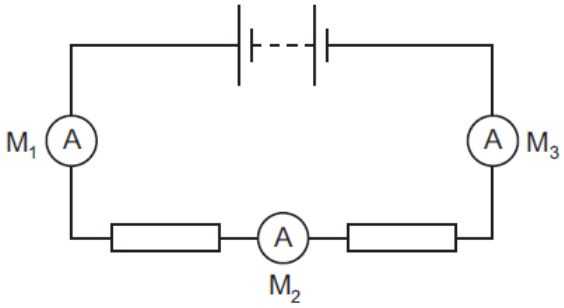
9. March/2020/Paper_22/No.33

The diagram shows a battery connected to two resistors. Three ammeters M_1, M_2 and M_3 are connected in the circuit.



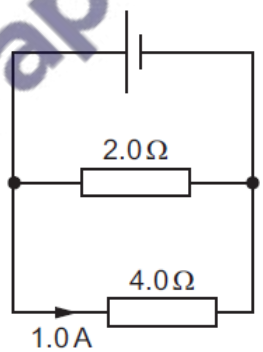
Ammeter M_1 reads 1.0 A.

What are the readings on M_2 and on M_3?

	reading on M_2 / A	reading on M_3 / A
A	0.0	0.0
B	0.5	0.5
C	0.5	1.0
D	1.0	1.0

10. March/2020/Paper_22/No.34

A cell is connected to a parallel combination of a 2.0 Ω resistor and a 4.0 Ω resistor. The current in the 4.0 Ω resistor is 1.0 A.



What is the current in the cell?

A 1.0 A **B** 1.5 A **C** 2.0 A **D** 3.0 A

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11. March/2020/Paper_32/No.11

Fig. 11.1 shows lamps in series. Fig. 11.2 shows lamps in parallel.

The lamps are all identical 6.0 V lamps. In each circuit there are three ammeters A_1, A_2 and A_3.

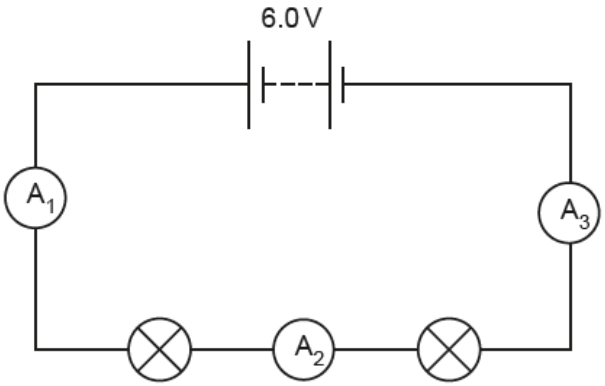

Fig. 11.1

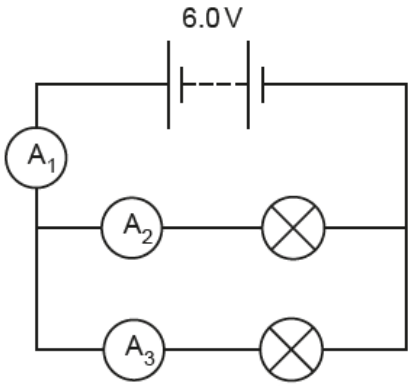

Fig. 11.2

(a) (i) Compare the readings on ammeters A_1, A_2 and A_3 in Fig. 11.1.

..... [1]

(ii) Compare the readings on ammeters A_1, A_2 and A_3 in Fig. 11.2.

..... [1]

(iii) State **two** advantages of connecting the 6.0 V lamps in parallel with the 6.0 V battery, compared with connecting the lamps in series with the battery.

1. .....

.....

2. .....

.....

[2]

(b) Each lamp has a resistance of 12 Ω.

(i) Determine the combined resistance of the two lamps connected in **series**.

resistance = ... Ω [1]

(ii) Compare the resistance of one lamp with the combined resistance of the two lamps in **parallel**.

.....

..... [1]

[Total: 6]

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12. March/2020/Paper_42/No.8

Fig. 8.1 shows a circuit.

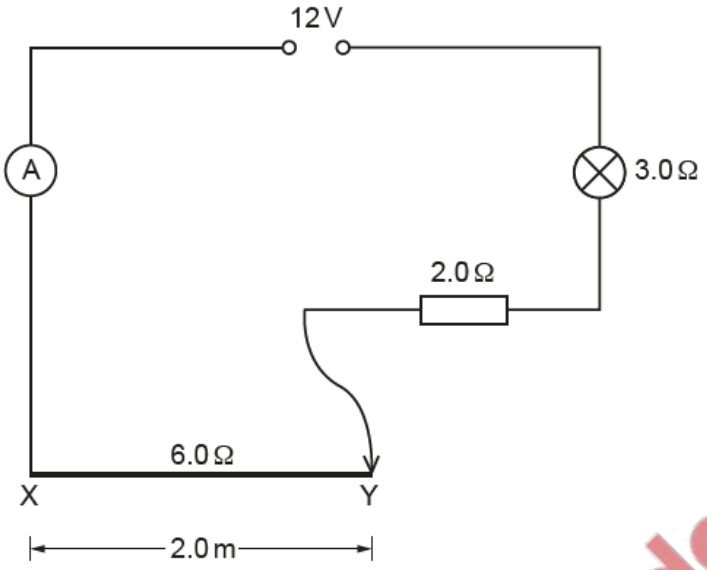

Fig. 8.1

The lamp has a resistance of 3.0 Ω. Line XY represents a uniform resistance wire of resistance 6.0 Ω.

(a) Calculate the reading on the ammeter.

ammeter reading = ... [2]

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(b) Fig. 8.2 shows the circuit with a different connection to the resistance wire and an added resistor. The length XY of the whole resistance wire is 2.0 m. The contact is made at Q where the distance XQ is 0.60 m.

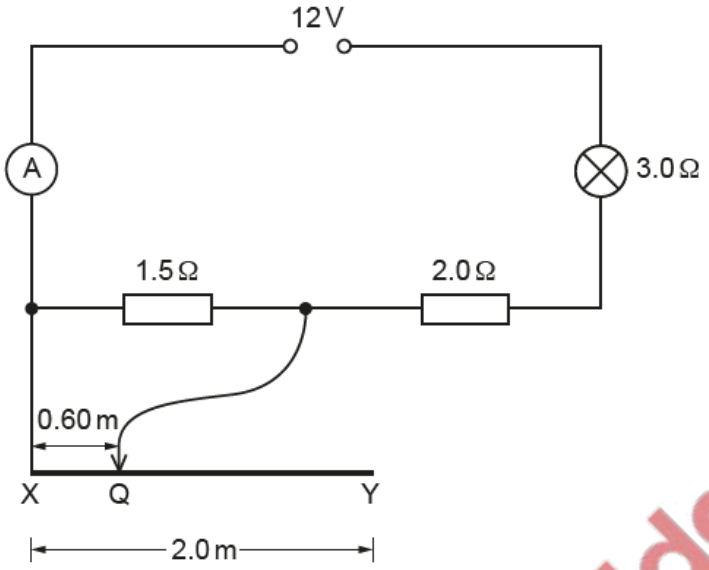

Fig. 8.2

Calculate the resistance of the circuit.

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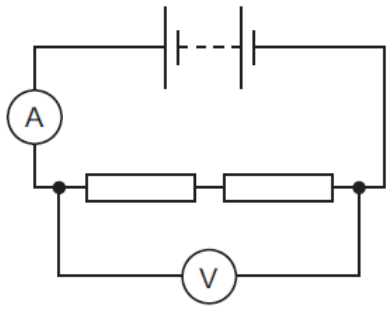
resistance = ... [4]

[Total: 6]

13. June/2020/Paper_11/No.31

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



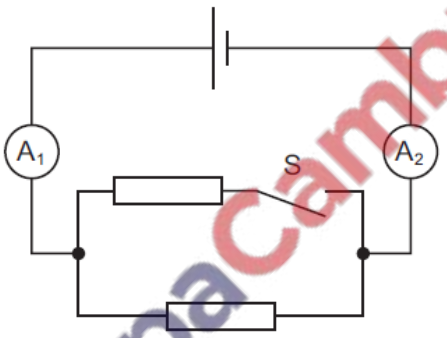
The voltmeter reading is 2.2 V and the ammeter reading is 0.25 A.

What is the resistance of each resistor?

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

14. June/2020/Paper_11/No.32

In the circuit shown, A_1 and A_2 are ammeters.



Switch S is closed.

Which row is correct?

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

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15. June/2020/Paper_11/No.33

What happens to the resistance of an LDR when the brightness of light falling on it increases?

A Its resistance decreases.

B Its resistance increases.

C Its resistance increases then decreases.

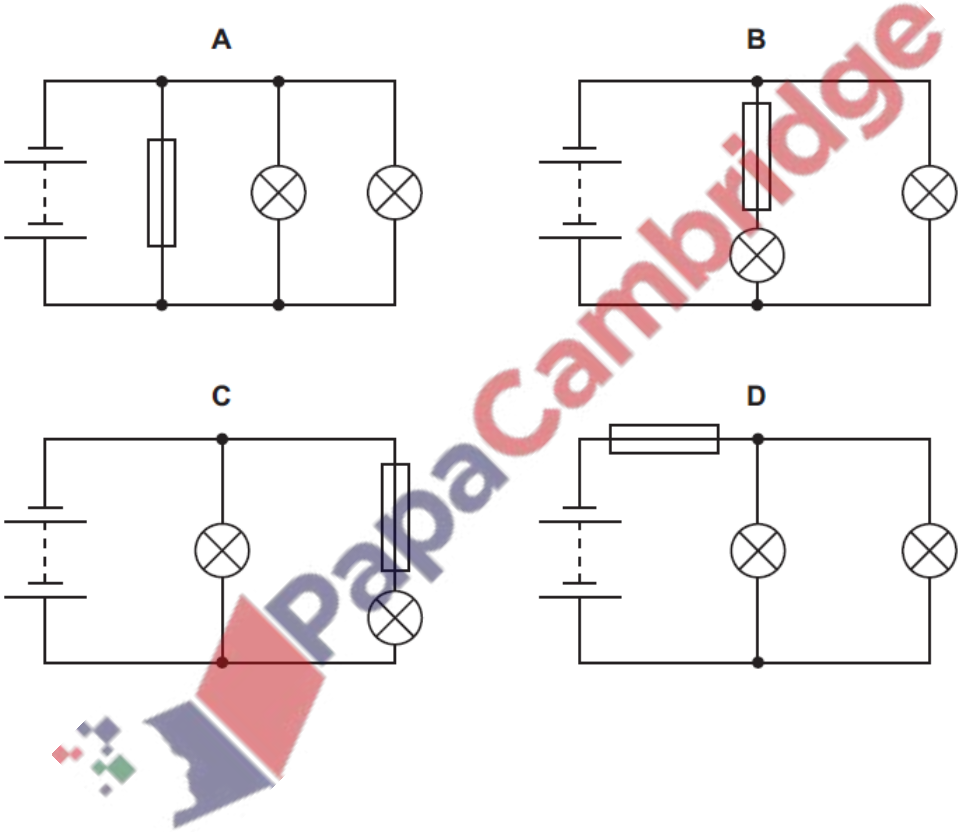
D Its resistance stays the same.

16. June/2020/Paper_11/No.34

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?



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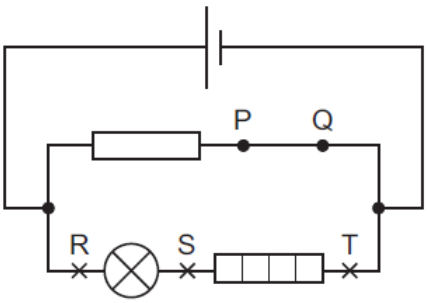
17. June/2020/Paper_12/No.30

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

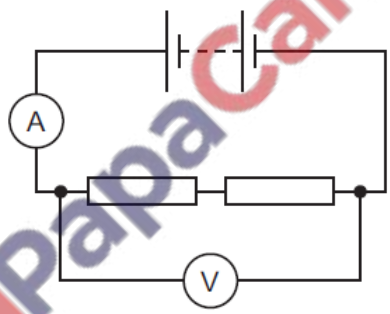
B in parallel with R and S

C in parallel with R and T

D in parallel with S and T

18. June/2020/Paper_12/No.31

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

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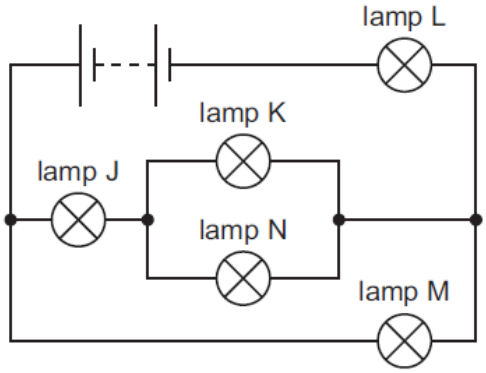
19. June/2020/Paper_12/No.32

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

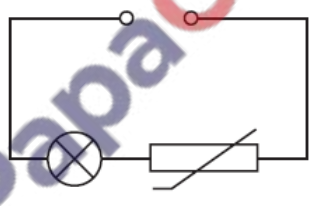
B lamp K

C lamp L

D lamp M

20. June/2020/Paper_12/No.33

The diagram shows a control circuit. The lamp is lit.



The temperature of the surroundings increases.

What will happen to the brightness of the lamp?

A It will be brighter.

B It will be less bright.

C It will not change.

D It will become brighter and then less bright.

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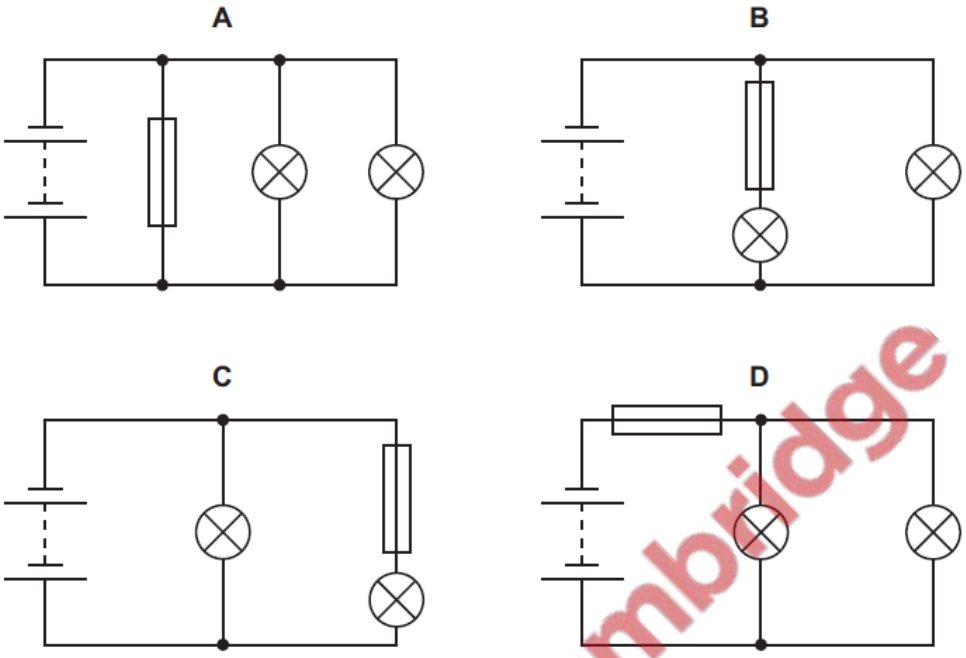
21. June/2020/Paper_12/No.34

A student constructs four circuits, each containing a fuse.

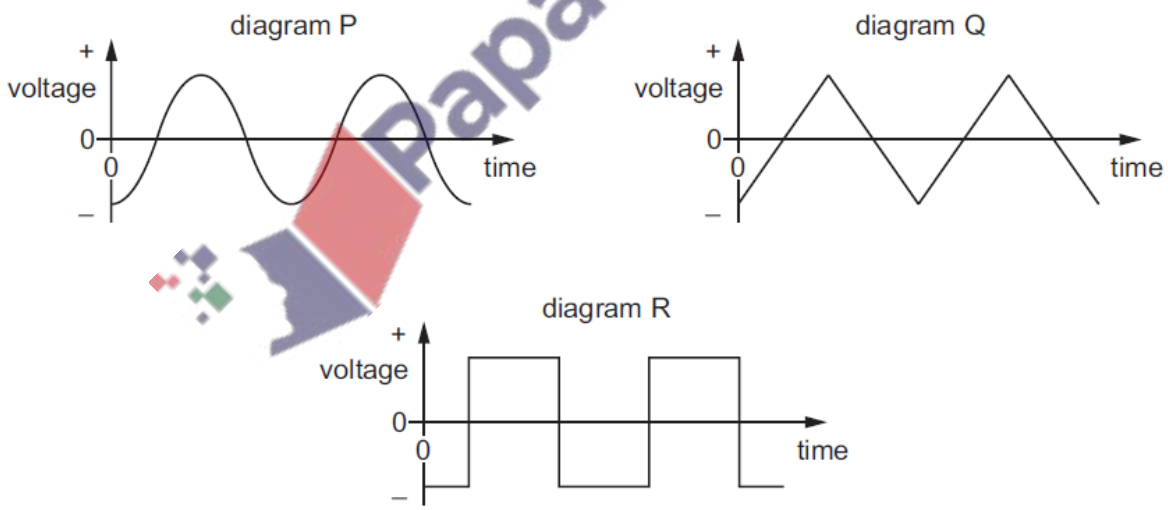
The fuse blows in one circuit and both lamps in the circuit go out.

In which circuit does the fuse blow and both lamps go out?



22. June/2020/Paper_12/No.35

The diagrams P, Q and R show three voltage–time graphs.



Which graphs show an alternating voltage?

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

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23. June/2020/Paper_13/No.30

Three electrical quantities are listed.

- potential difference
- electromotive force
- current

Which quantities are measured in volts?

A potential difference only

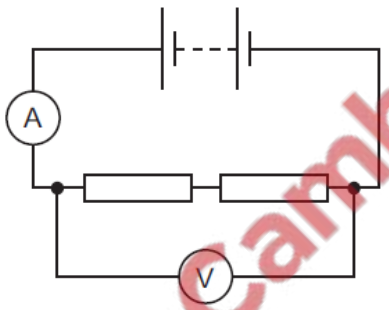
B potential difference and current only

C potential difference and electromotive force only

D potential difference, electromotive force and current

24. June/2020/Paper_13/No.31

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



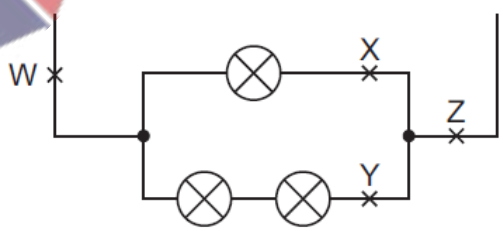
The voltmeter reading is 2.2 V and the ammeter reading is 0.25 A.

What is the resistance of each resistor?

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

25. June/2020/Paper_13/No.32

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

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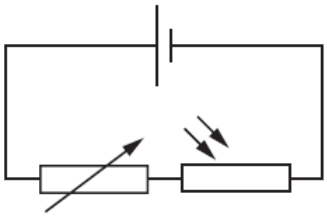
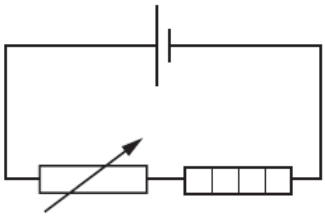
26. June/2020/Paper_13/No.33

Which circuit contains a thermistor and a heater?

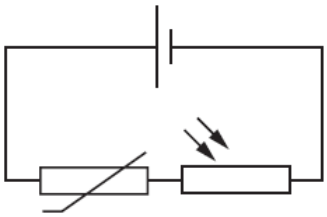
A



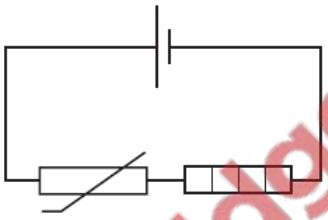
B



C



D



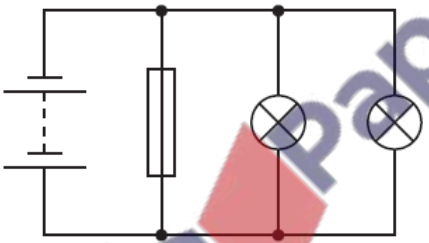
27. June/2020/Paper_13/No.34

A student constructs four circuits, each containing a fuse.

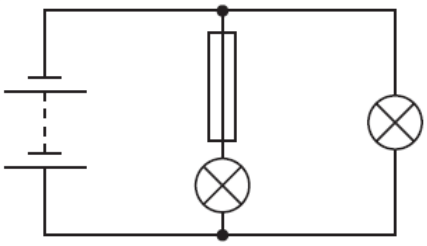
The fuse blows in one circuit and both lamps in the circuit go out.

In which circuit does the fuse blow and both lamps go out?

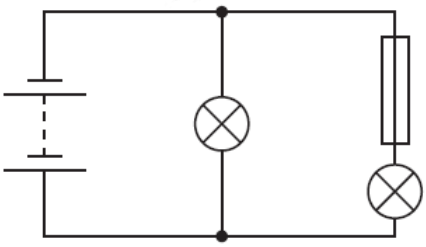
A



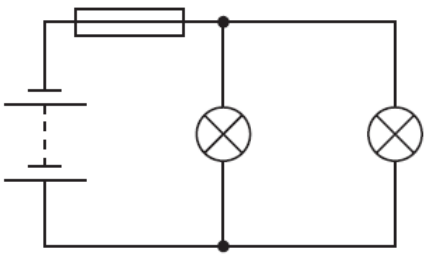
B



C



D



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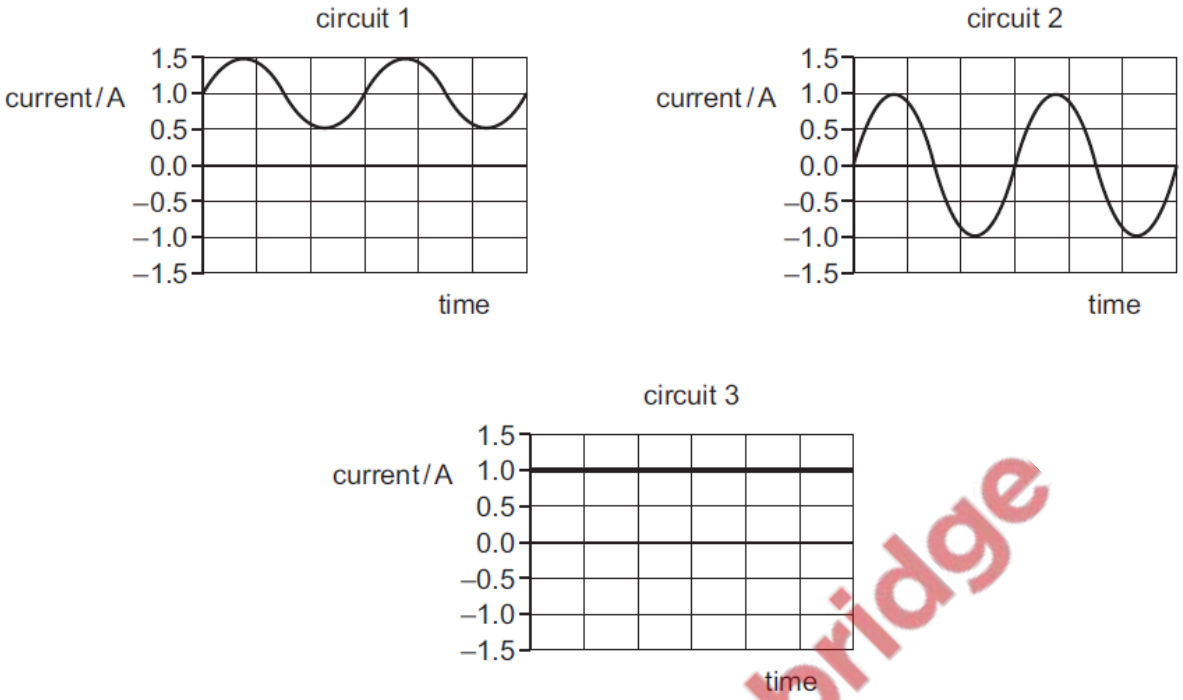
28. June/2020/Paper_13/No.35

The graphs show how the currents in three circuits vary with time.

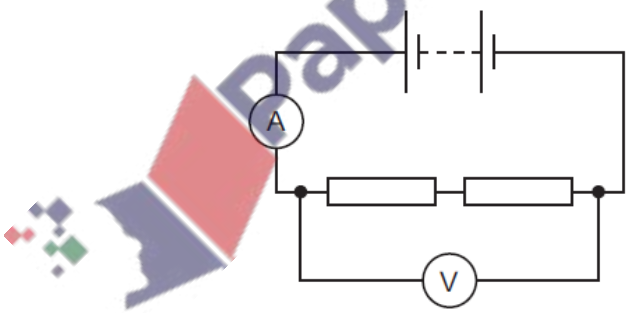


In which circuits is there a direct current?

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

29. June/2020/Paper_21/No.28

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

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30. June/2020/Paper_21/No.29

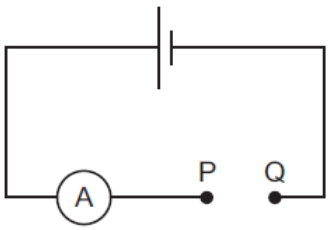
An electric fire is connected to a 240 V supply and transfers energy at a rate of 1.0 kW.

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

31. June/2020/Paper_21/No.30

The diagram shows an incomplete circuit. The temperature and light levels around the circuit remain unchanged.



Four electrical components are connected in turn across PQ. The cell is reversed and the four electrical components are connected again in turn across PQ.

For which component is there a significant change in the magnitude of the current?

A diode

B light-dependent resistor

C resistor

D thermistor

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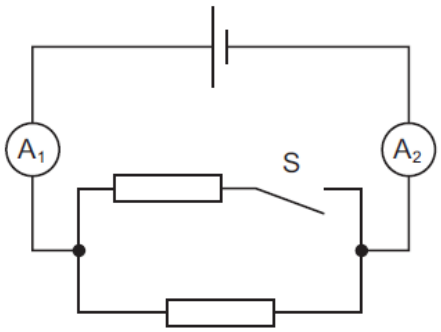
32. June/2020/Paper_21/No.31

In the circuit shown, A_1 and A_2 are ammeters.



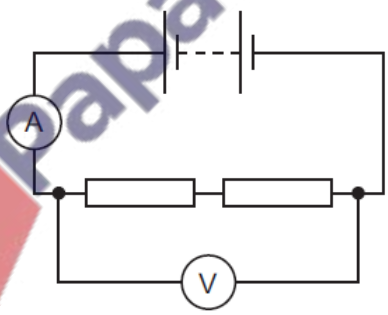
Switch S is closed.

Which row is correct?

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

33. June/2020/Paper_22/No.29

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

34. June/2020/Paper_22/No.30

A cell passes a current of 2.0 A in a circuit for 30 s. In this time the cell transfers 120 J of energy.

What is the electromotive force (e.m.f.) of the cell?

A 0.50 V **B** 1.5 V **C** 2.0 V **D** 8.0 V

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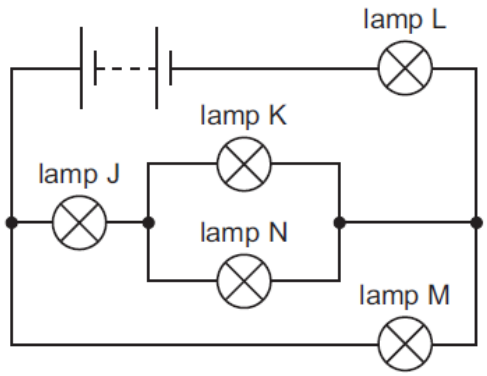
35. June/2020/Paper_22/No.31

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

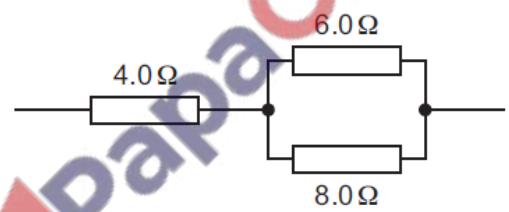
B lamp K

C lamp L

D lamp M

36. June/2020/Paper_22/No.32

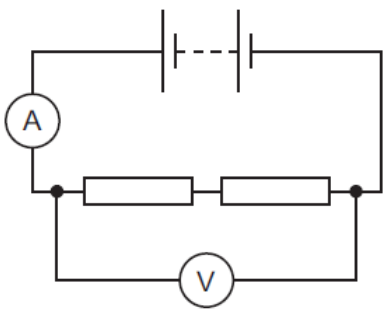
What is the effective resistance of the following combination of resistors?



A 1.8 Ω **B** 7.4 Ω **C** 11 Ω **D** 18 Ω

37. June/2020/Paper_23/No.29

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

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38. June/2020/Paper_23/No.30

There is a current of 2.0 A in a resistor of resistance 8.0 Ω.

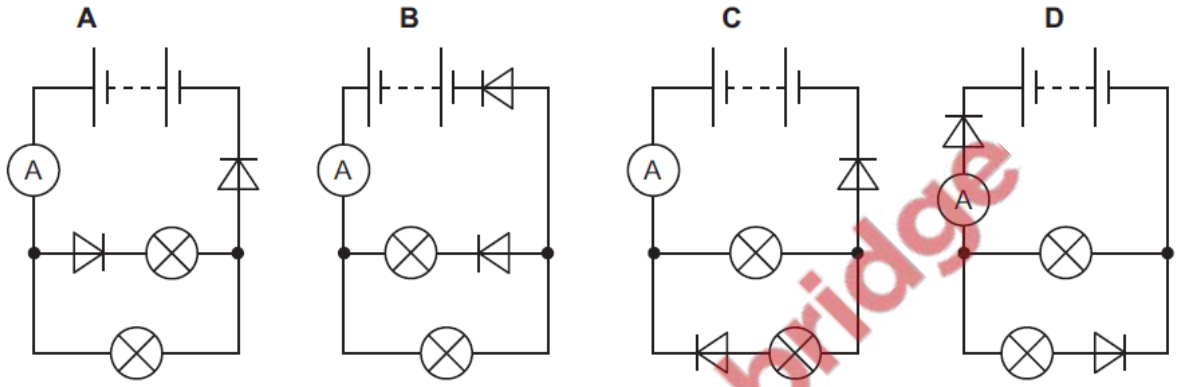
How much power is dissipated in the resistor?

A 0.25 W **B** 4.0 W **C** 16 W **D** 32 W

39. June/2020/Paper_23/No.31

The lamps, the diodes and the batteries in the circuits are identical.

In which circuit does the ammeter give the greatest reading?



40. June/2020/Paper_23/No.32

Two resistors are connected in series with a power supply.

Which statement about the circuit is correct?

A The current from the supply is greater than the current in each resistor.

B The current from the supply is equal to the current in each resistor.

C The current from the supply is less than the current in each resistor.

D The current from the supply is the sum of the currents in each resistor.

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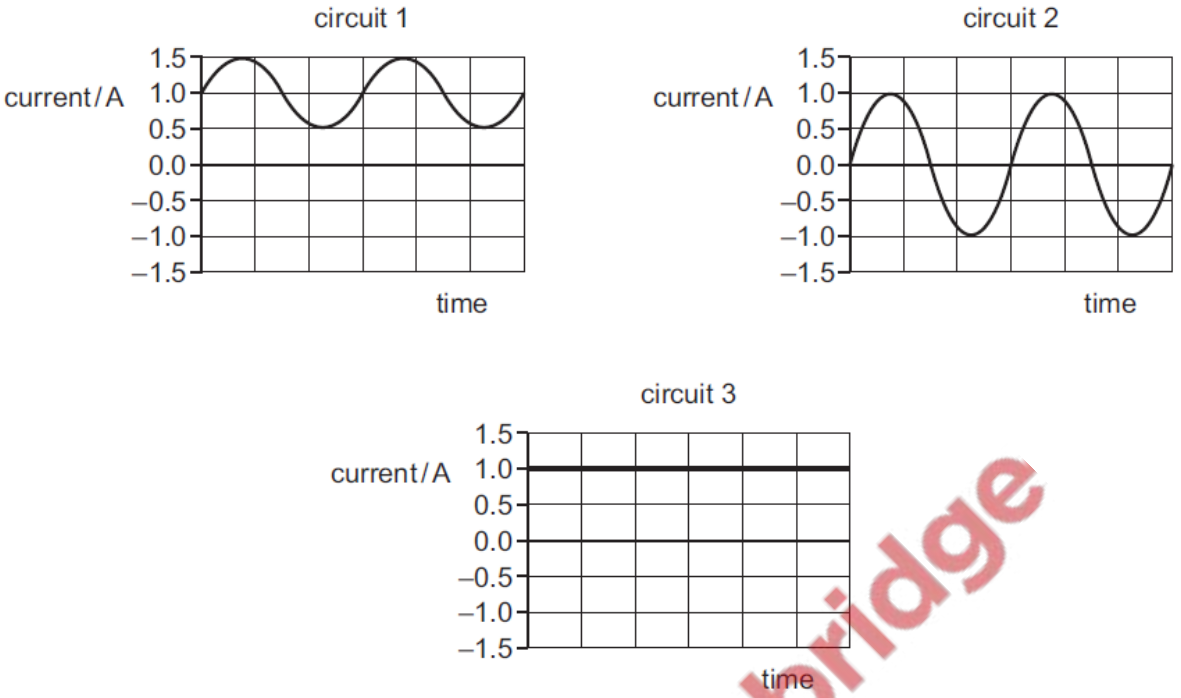
41. June/2020/Paper_23/No.35

The graphs show how the currents in three circuits vary with time.



In which circuits is there a direct current?

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

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42. June/2020/Paper_31/No.10

(a) A student investigates the electrical resistance of some components.

Fig. 10.1 shows an incomplete diagram of the circuit used by the student.

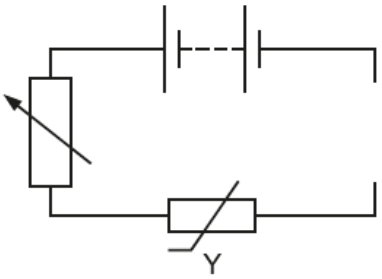

Fig. 10.1

(i) State the term used for component Y. ..... [1]

(ii) The student uses the circuit to measure the resistance of component Y.

Complete the diagram in Fig. 10.1 by adding electrical symbols to show an ammeter and a voltmeter correctly connected to determine the resistance of component Y. [3]

(b) Fig. 10.2 shows two resistors A and B.

Fig. 10.2

(i) Resistor A and resistor B are connected in series.

State the value of their combined resistance.

..... Ω [1]

(ii) Resistor A and resistor B are connected in parallel.

Compare the combined resistance when in parallel with the resistance of resistor A alone.

..... [1]

[Total: 6]

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43. June/2020/Paper_31/No.11(a)

A teacher uses a power supply in a metal case. The circuit for the power supply includes a fuse.

(a) (i) Draw the electrical symbol for a fuse. [1]

(ii) The metal case of the power supply is earthed. A fault occurs and a live wire touches the metal case.

Explain how earthing the metal case protects the teacher.

.....

.....

.....

..... [3]

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44. June/2020/Paper_41/No.8

The power supply used in an electric vehicle contains 990 rechargeable cells each of electromotive force (e.m.f.) 1.2 V.

The cells are contained in packs in which all the cells are in series with each other. The e.m.f. of each pack is 54 V.

(a) Calculate the number of packs in the power supply.

number of packs = ... [2]

(b) When in use, each pack supplies a current of 3.5 A.

(i) Calculate the rate at which each cell is transferring chemical energy to electrical energy.

rate of energy transfer = ... [2]

(ii) The packs are connected in parallel to supply a large current to drive the electric vehicle.

Explain why it is necessary to use thick wires to carry this current.

.....

.....

.....

..... [3]

[Total: 7]

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45. June/2020/Paper_42/No.8

(a) A light-emitting diode (LED) is a diode that emits light when there is a current in it. Draw a circuit diagram showing an LED, connected so that it is lit, in series with a battery and a fixed resistor. Use standard electrical symbols.

[4]

(b) The p.d. across the LED when lit is 3.1 V and the current in the LED is 0.030A.

Calculate the value of the resistance of the LED when lit.

resistance = ... [2]

(c) Fig. 8.1 shows a power supply of e.m.f. 10.5 V connected in series with a lamp and a heater. The p.d. across the lamp is 2.1 V and the current in the lamp is 1.5A.

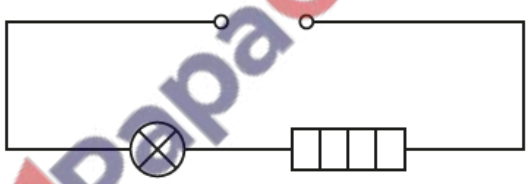

Fig. 8.1

Calculate:

(i) the resistance of the heater

resistance = ... [2]

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(ii) the power of the heater.

power = ... [2]

[Total: 10]

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