12.1 DC: Practical Circuits & Kirchhoff's Laws

Question Paper

Course	CIE A Level Physics (9702) 2019-2021
Section	12. D.C. circuits
Topic	12.1 DC: Practical Circuits & Kirchhoff's Laws
Difficulty	Medium

Time allowed: **10**

Score: **/10**

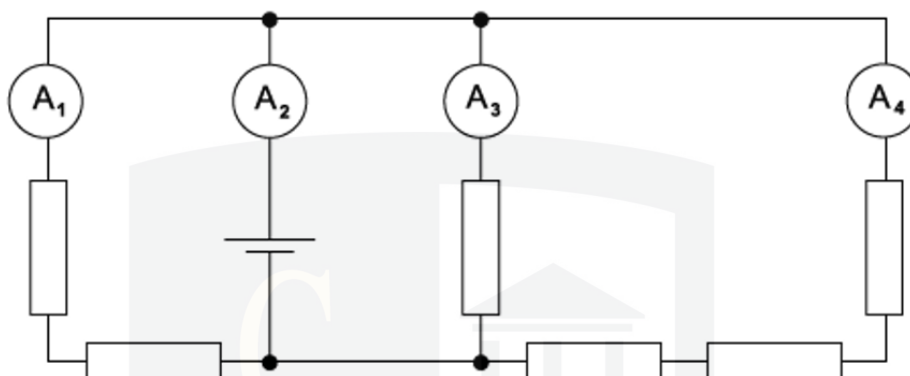**Percentage:** **/100**

Question 1

In the circuit shown, all the resistors are identical and all the ammeters have negligible resistance.

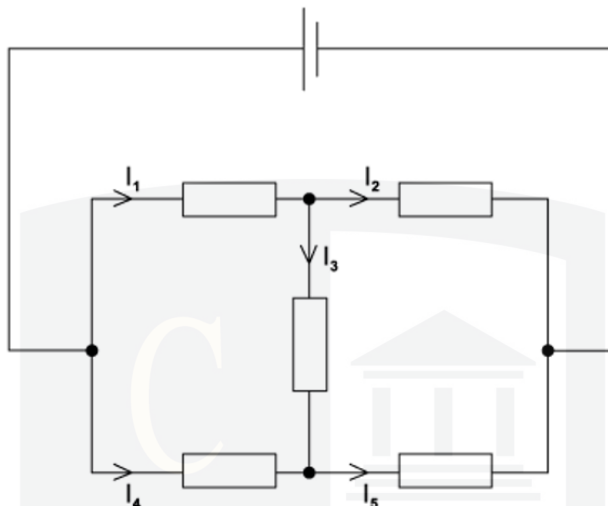The reading on ammeter A_1 is 0.6 A.

What are the readings on the other ammeters?

	reading on ammeter A_2 / A	reading on ammeter A_3 / A	reading on ammeter A_4 / A
A	1.0	0.3	0.1
B	1.4	0.6	0.2
C	1.8	0.9	0.3
D	2.2	1.2	0.4

[1 mark]

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Question 2

The diagram shows currents I_1, I_2, I_3, I_4 and I_5 in different branches of a circuit.
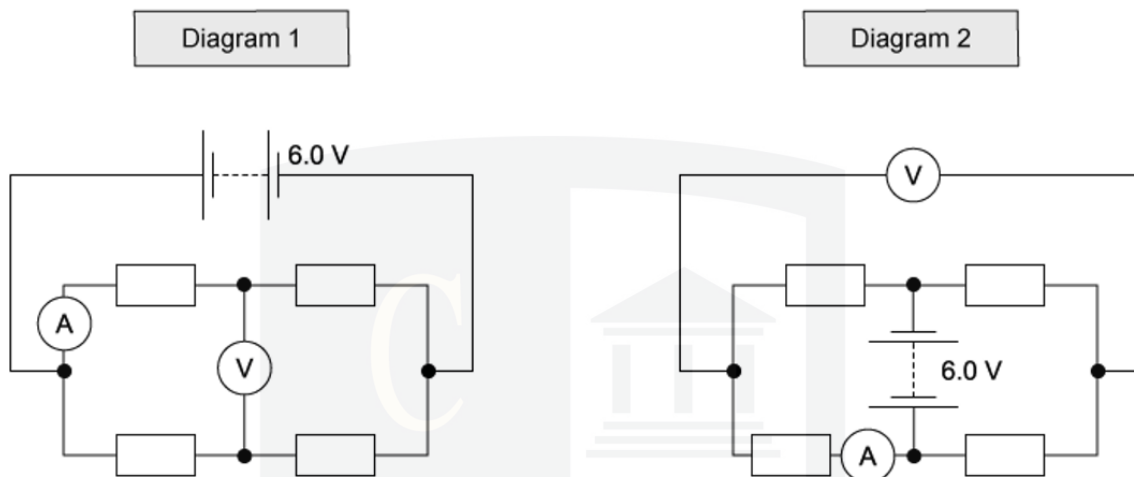

Which one of the following is correct?

A $I_1 = I_2 + I_3$

B $I_2 = I_1 + I_3$

C $I_3 = I_4 + I_5$

D $I_4 = I_5 + I_3$

[1 mark]

Question 3

When four identical resistors are connected as shown in diagram 1, the ammeter reads 1.0 A, and the voltmeter reads zero.

Diagram 1	Diagram 2

The resistors and meters are reconnected to the supply, as shown in diagram 2.

What are the meter readings in diagram 2?

	voltmeter reading / V	ammeter reading / A
A	0	1.0
B	3.0	0.5
C	3.0	1.0
D	6.0	0

[1 mark]

A simple circuit is formed by connecting a resistor of resistance R between the terminals of a battery of electromotive force (e.m.f.) 9.0 V and constant internal resistance r.
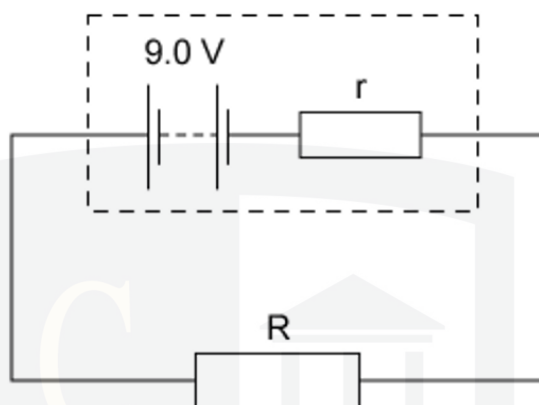
A charge of 6.0 C flows through the resistor in a time of 2.0 minutes, causing it to dissipate 48 J of thermal energy.
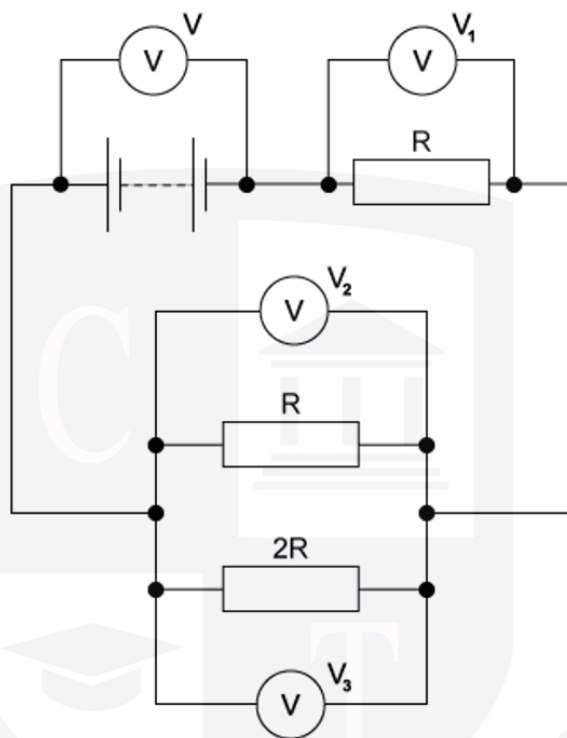
What is the internal resistance r of the battery?

A 0.17 Ω   **B** 0.33 Ω   **C** 20 Ω   **D** 160 Ω

[1 mark]

Question 5

The diagram shows a circuit with four voltmeter readings V, V_1, V_2 and V_3.

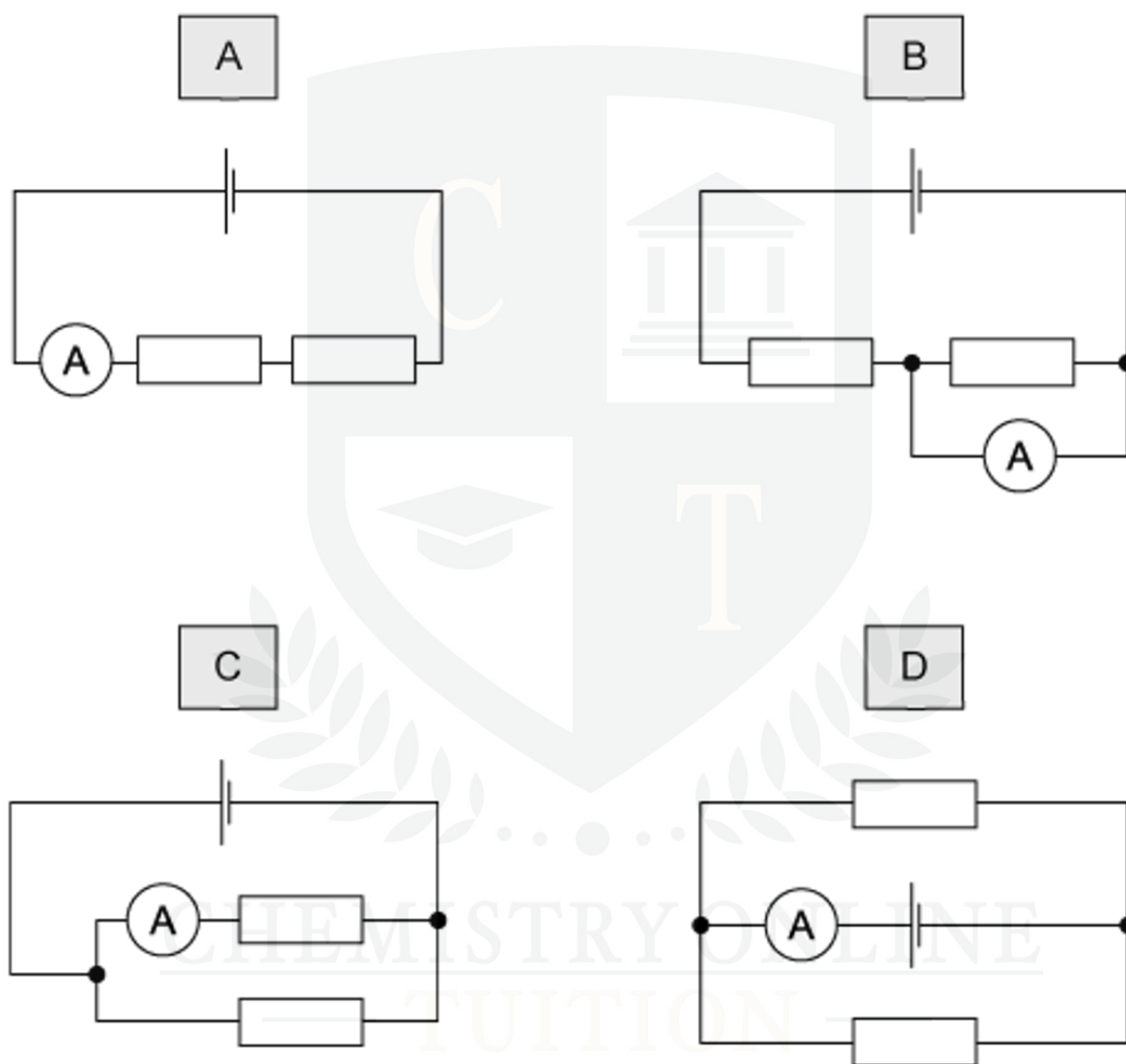Which equation relating the voltmeter readings must be true?

A $V = V_1 + V_2 + V_3$

B $V + V_1 = V_2 + V_3$

C $V_3 = 2(V_2)$

D $V - V_1 = V_3$

[1 mark]

Question 6

A cell, two resistors of equal resistance and an ammeter are used to construct four circuits. The resistors are the only parts of the circuits that have resistance.
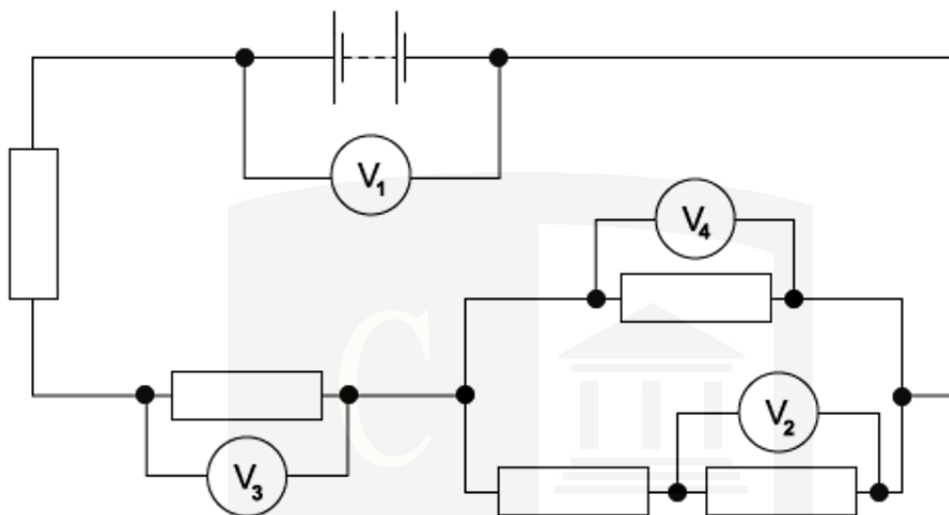
In which circuit will the ammeter show the greatest reading?

[1 mark]

Question 7

In the circuit shown, all the resistors are identical.

The reading on voltmeter V_1 is 8.0 V and the reading on voltmeter V_2 is 1.0 V. What are the readings on the other voltmeters?
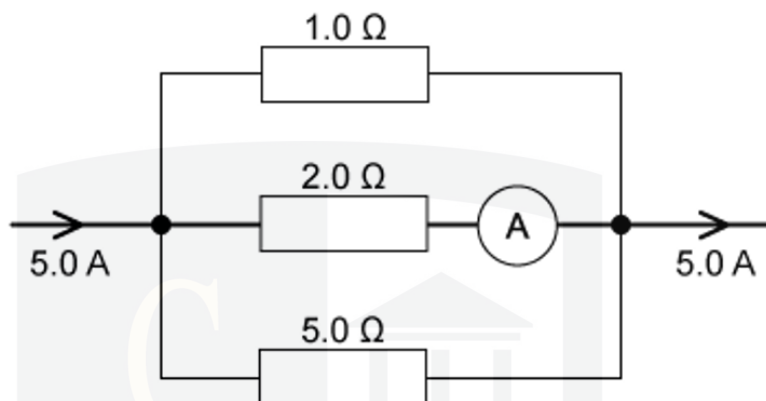
	reading on voltmeter V_3 / V	reading on voltmeter V_4 / V
A	1.5	1.0
B	3.0	2.0
C	4.5	3.0
D	6.0	4.0

[1 mark]

Question 8

The diagram shows part of a current-carrying circuit. The ammeter has negligible resistance.

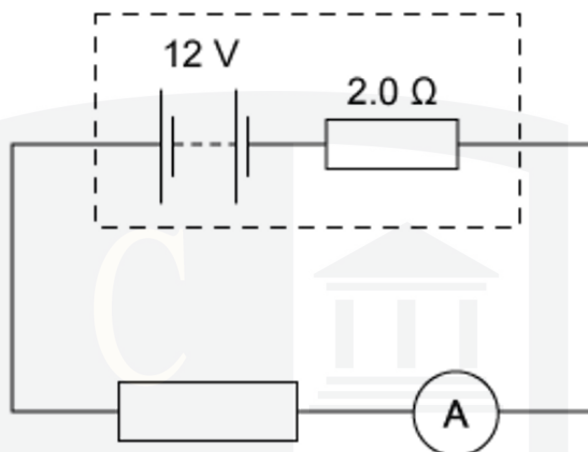
What is the reading on the ammeter?

A 0.7 A   **B** 1.3 A   **C** 1.5 A   **D** 1.7 A

[1 mark]

Question 9

A battery of e.m.f. 12 V and internal resistance 2.0 Ω is connected in series with an ammeter of negligible resistance and an external resistor. External resistors of various different values are used.
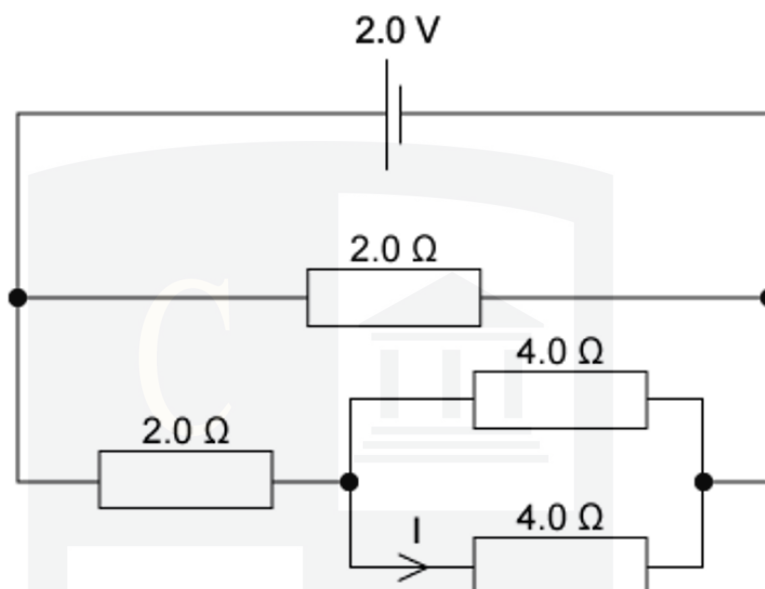

Which combination of current and resistor value is **not** correct?

	current / A	external resistor value / Ω
A	1.0	10.0
B	1.2	8.0
C	1.5	6.0
D	1.8	4.0

[1 mark]

Question 10

A cell of e.m.f. 2.0 V and negligible internal resistance is connected to a network of resistors as shown.

What is the current I?

A   0.25 A   **B**   0.33 A   **C**   0.50 A   **D**   1.5 A

[1 mark]