

Unit 10: D.C. circuits:

Subunit 10.2: Kirchhoff's laws:

Topical Question No: 1

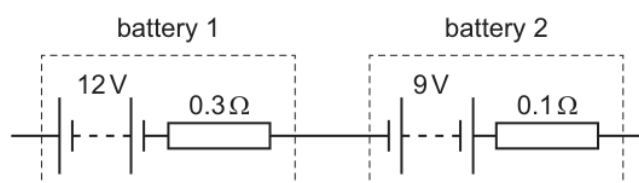
- 36 In deriving a formula for the combined resistance of three different resistors in series, Kirchhoff's laws are used.

Which physics principle is involved in this derivation?

- A the conservation of charge
- B the direction of the flow of charge is from negative to positive
- C the potential difference across each resistor is the same
- D the current varies in each resistor, in proportion to the resistor value

Topical Question No: 2

- 35 Two batteries are connected together, as shown.



Battery 1 has electromotive force (e.m.f.) 12V and internal resistance 0.3Ω .

Battery 2 has e.m.f. 9V and internal resistance 0.1Ω .

What are the e.m.f. and the internal resistance of a single battery that has the same effect as the combination?

	e.m.f. /V	internal resistance / Ω
A	3	0.2
B	3	0.4
C	21	0.2
D	21	0.4

Topical Question No: 3

- 35 In deriving a formula for the combined resistance of three different resistors in series, Kirchhoff's laws are used.

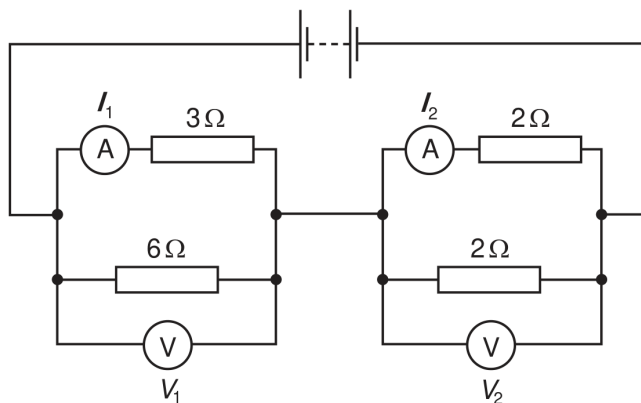
Which physics principle is involved in this derivation?

- A the conservation of charge
- B the direction of the flow of charge is from negative to positive
- C the potential difference across each resistor is the same
- D the current varies in each resistor, in proportion to the resistor value

Space for working

Topical Question No: 4

- 37 In the circuit shown, the ammeters have negligible resistance and the voltmeters have infinite resistance.



The readings on the meters are I_1 , I_2 , V_1 and V_2 , as labelled on the diagram.

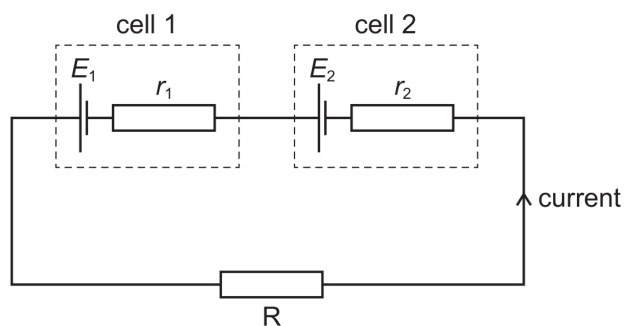
Which statement is correct?

- A $I_1 > I_2$ and $V_1 > V_2$
- B $I_1 > I_2$ and $V_1 < V_2$
- C $I_1 < I_2$ and $V_1 > V_2$
- D $I_1 < I_2$ and $V_1 < V_2$

Space for working

Topical Question No: 5

- 34 Two cells with electromotive forces E_1 and E_2 and internal resistances r_1 and r_2 are connected to a resistor R as shown.



The terminal potential difference across cell 1 is zero.

Which expression gives the resistance of resistor R?

- A** $\frac{E_2 r_1 - E_1 r_2}{E_1}$ **B** $\frac{E_2 r_1 - E_1 r_2}{E_2}$ **C** $\frac{E_1 r_2 - E_2 r_1}{E_1}$ **D** $\frac{E_1 r_2 - E_2 r_1}{E_2}$

Answer Key

1. N/A
2. B
3. N/A
4. N/A
5. N/A