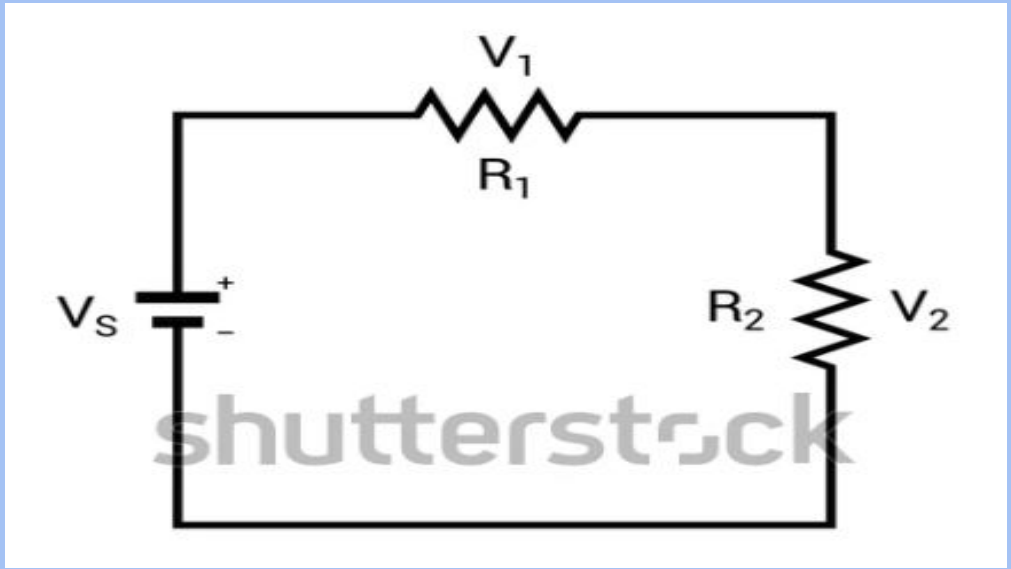
SUBJECT: BASIC ELECTRONICS

Voltage Divider Rule

Elementrix Classes

Voltage Divider Rule

Let's consider a simple series circuit with two resistors, R_1 and R_2, connected in series, and a voltage source (V_{total}) connected across the combination.



1. Define the Voltages and Resistances:

V_{total} = 10 volts

R_1 = 3Ω

R_2 = 5Ω

2. Calculate Total Resistance (R_{total}):

$R_{total} = R_1 + R_2 = 3 + 5 = 8Ω$

3. Apply Voltage Divider Rule for R_1:

$$V_1 = V_{total} \times \frac{R_1}{R_{\text{total}}} = 10 \times \frac{3}{8} = \frac{30}{8} = 3.75\,volts$$

V_1 = 3.75 volts

4. Apply Voltage Divider Rule for R_2:

$$V_2 = V_{total} \times \frac{R_2}{R_{total}} = 10 \times \frac{5}{8} = \frac{50}{8} = 6.25\,volts$$

V_2 = 6.25 volts

This means that in the given series circuit, 3.75 volts is dropped across the 3-ohm resistor (R_1), and 6.25 volts is dropped across the 5-ohm resistor (R_2). **The sum of these individual voltages equals the total voltage (V_{total}), confirming the conservation of energy in the circuit.**

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