

Unit 1.2 Electronic Principles: Ohm's Law

Ohm's Law is the relationship between voltage, current, and the resistance in a DC circuit. When you know any two of these values, you can calculate the third.

The most basic equation for Ohm's Law is: $E = I \times R$

In other words, when you know the current going into a circuit and the resistance of the circuit, the formula used to calculate voltage across the circuit is voltage (E) equals current (I) multiplied by resistance (R). (T5D02) When you know the voltage across a circuit and the current in the circuit, the formula used to calculate resistance in a circuit is resistance (R) equals voltage (E) divided by current (I). (T5D03)

We can also write this formula as $R = E \div I$

When you know the voltage across a circuit and the resistance of a circuit, the formula used to calculate current in the circuit is current (I) equals voltage (E) divided by resistance (R). (T5D01) This formula is written $I = E \div R$

Examples:

The resistance of a circuit in which a current of 3 amperes flows through a resistor connected to 90 volts is 30 ohms. (T5D04); $R = E \div I$ or $90 \text{ V} \div 3 \text{ A} = 30 \Omega$

The resistance in a circuit for which the applied voltage is 12 volts and the current flow is 1.5 amperes is 8 ohms. (T5D05); $R = E \div I$ or $12 \text{ V} \div 1.5 \text{ A} = 8 \Omega$

The resistance of a circuit that draws 4 amperes from a 12-volt source is 3 ohms. (T5D06) $R = E \div I$ or $12 \text{ V} \div 4 \text{ A} = 3 \Omega$

The current Flow in a circuit with an applied voltage of 120 volts and a resistance of 80 ohms is 1.5 amperes. (T5D07); $I = E \div R = 120 \text{ V} \div 80 \Omega = 1.5 \text{ A}$

The current Flowing through a 100-ohm resistor connected across 200 volts is 2 amperes. (T5D08); $I = E \div R$ or $200 \text{ V} \div 100 \Omega = 2 \text{ A}$

The current Flowing through a 24-ohm resistor connected across 240 volts is 10 amperes. (T5D09); $I = E \div R$ or $240 \text{ V} \div 24 \Omega = 10 \text{ A}$

The voltage across a 2-ohm resistor if a current of 0.5 amperes flows through it is 1 volt. (T5D10); $E = I \times R$ or $0.5 \text{ A} \times 2 \Omega = 1 \text{ V}$

The voltage across a 10-ohm resistor if a current of 1 ampere flows through it is 10 volts. (T5D11); $E = I \times R$ or $1 \text{ A} \times 10 \Omega = 10 \text{ V}$

The voltage across a 10-ohm resistor if a current of 2 amperes flows through it is 20 volts. (T5D12); $E = I \times R$ or $2 \text{ A} \times 10 \Omega = 20$

QUESTION POOL: (12)

T5D02	T5D03	T5D01	T5D04	T5D05	T5D06
T5D07	T5D08	T5D09	T5D10	T5D11	T5D12