

# Class 10 Electricity Formulas

## Physical Quantities, Symbols and their SI Units

Physical Quantity	Symbols	SI Unit
Voltage (Potential Difference)	V	Volt (V)
Work Done	W	Joule (J)
Charge	Q or q	Coulomb (C)
Current	I	Ampere (A)
Resistance	P	Ohm ( $\Omega$ )
Resistivity	$\rho$	Ohm.meter ( $\Omega\text{m}$ )
Power	P	Watt (W)
Heat Produced	H	Joule (J)

## Symbols for Commonly used Electrical Components

S. No.	Component	Symbol
1	An electric cell	
2	A battery or a combination of cells	
3	Plug key or switch (open)	
4	Plug key or switch (closed)	
5	A wire joint	
6	Wires crossing without joining	
7	Electric bulb	
8	A resistor of resistance R	
9	Variable resistance or rheostat	
10	Ammeter	
11	Voltmeter	

## Formulas For Electricity

- Charge  $q$  on a body is always denoted by  
 $q = ne$   
 where  $n$  = any integer positive or negative and  $e = 1.602 \times 10^{-19} \text{C}$  i. e., charge on an electron or proton.
- Work done** = *charge*  $\times$  *potential* or potential difference  
 Mathematically,  
 $W = qV = q(V_2 - V_1)$  *Joule*
- Electric Current** =  $\frac{\text{charge}}{\text{time}}$   
 Or,  
 $I = \frac{q}{t}$  *Ampere*
- Ohm's Law**  
 $\text{Resistance} = \frac{\text{potential difference}}{\text{current}}$   
 Or,  
 $R = \frac{V}{I}$
- Resistance in terms of resistivity**  
 $R = \frac{\rho l}{A}$
- Resistance in series combination**  
 $R_s = R_1 + R_2 + R_3 + \dots$
- Resistance in parallel combination**  
 $\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \dots$
- Electrical Power**  
 $P = VI = I^2R = \frac{V^2}{R}$
- Power in Series**  
 $\frac{1}{P_s} = \frac{1}{P_1} + \frac{1}{P_2} + \frac{1}{P_3} + \dots$
- Power in parallel**  
 $P_p = P_1 + P_2 + P_3 + \dots$
- Electrical Energy**  
 $E - Vit = I^2Rt = \frac{V^2}{R}t$
- Heat produced**  
 $H - Vit = I^2Rt = \frac{V^2}{R}t$

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