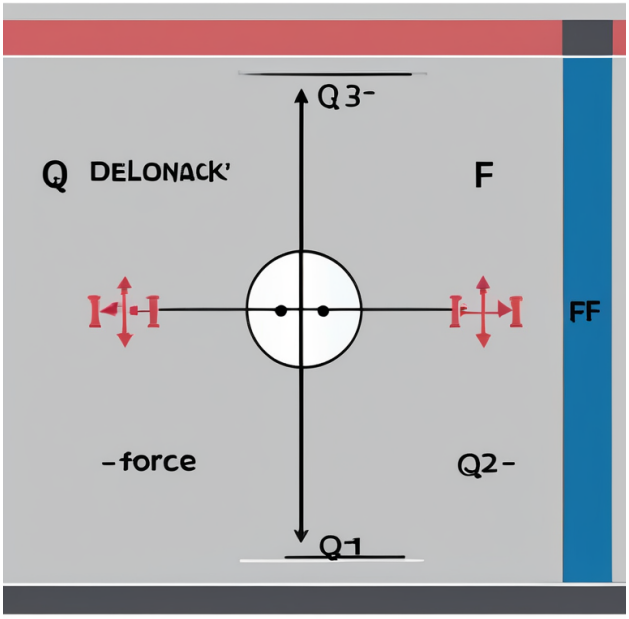
e

$$F = k\frac{|q_1 q_2|}{r^2}$$

Frq_2q_1

$8.988 \times 10^9 \cdot {}^2/^2k$



$$r = 0.05\, q_2 = -3 \times 10^{-9}\, q_1 = +2 \times 10^{-9}$$

$$F = k\frac{|q_1 q_2|}{r^2}$$

$$F = (8.988 \times 10^9 \cdot {}^2/^2)\frac{|(+2 \times 10^{-9})(-3 \times 10^{-9})|}{(0.05)^2}$$

$$F = (8.988 \times 10^9)\frac{6 \times 10^{-18}}{0.0025}$$

$$F = (8.988 \times 10^9) \times (2.4 \times 10^{-15})$$

$$F \approx 21.57 \times 10^{-6}$$

21.57

$$\vec{F}_{1,} = \vec{F}_{12} + \vec{F}_{13} + \ldots q_1 q_1 \vec{F}_{12}, \vec{F}_{13}, \ldots q_2, q_3, \ldots$$

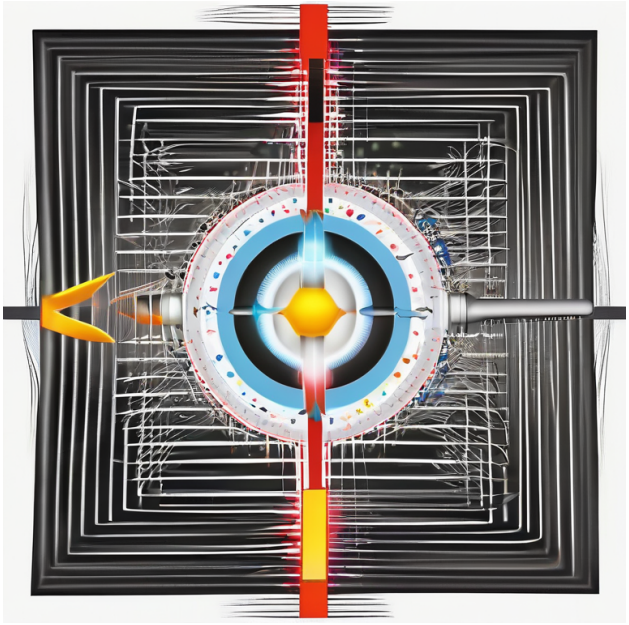
$q_0 \vec{F} \vec{E}$

$$\vec{E} = \frac{\vec{F}}{q_0}$$

//

qr

$$E = k\frac{|q|}{r^2}$$



$+5 \times 10^{-9}\,10$

$q = +5 \times 10^{-9}\, r = 10\ = 0.1$

$$E = k\frac{|q|}{r^2}$$

$$E = (8.988 \times 10^9\ \cdot {}^2/^2)\frac{5 \times 10^{-9}}{(0.1\,)^2}$$

$$E = (8.988 \times 10^9)\frac{5 \times 10^{-9}}{0.01}$$

$$E = (8.988 \times 10^9) \times (500 \times 10^{-9})$$

$$E = 8.988 \times 500\,/$$

$$E \approx 4494\,/$$

$4494\,/$

U

UV

$$V = \frac{U}{q_0}$$

$/$

ΔV

$$\Delta V = V_B - V_A = \frac{\Delta U}{q_0}$$

W

$$\Delta V = \frac{W_{A \to B}}{q_0}$$

qr

$$V = k\frac{q}{r}$$

q

$V_B = 50\, V_A = 10 + 4 \times 10^{-6}$
$W = q_0 \Delta V \Delta V = V_B - V_A = 50\ - 10\ = 40$

$$W = (4 \times 10^{-6}) \times (40)$$

$$W = 160 \times 10^{-6}$$

$$W = 1.6 \times 10^{-4}$$

1.6×10^{-4}

I

$$I = \frac{\Delta q}{\Delta t}$$

$/\Delta t \Delta q$

$$R = \rho \frac{L}{A}$$

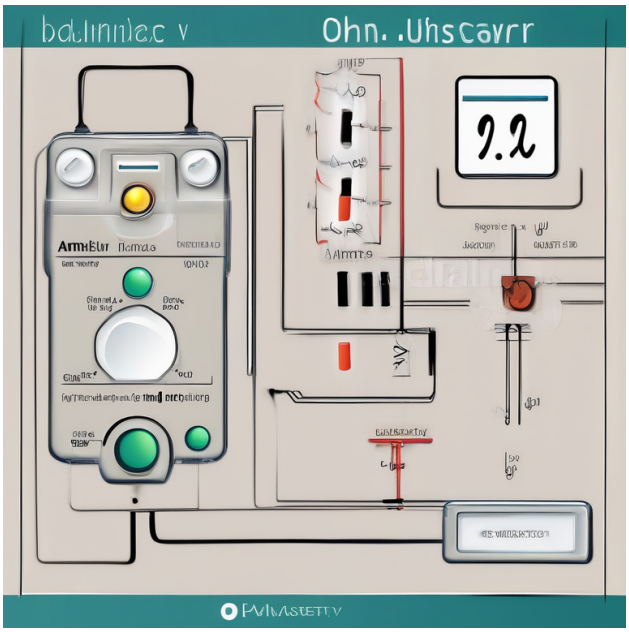
R

$\Omega / AL\Omega \cdot \rho$

RVI

$$V = I \cdot R$$

$R = \frac{V}{I} I = \frac{V}{R}$



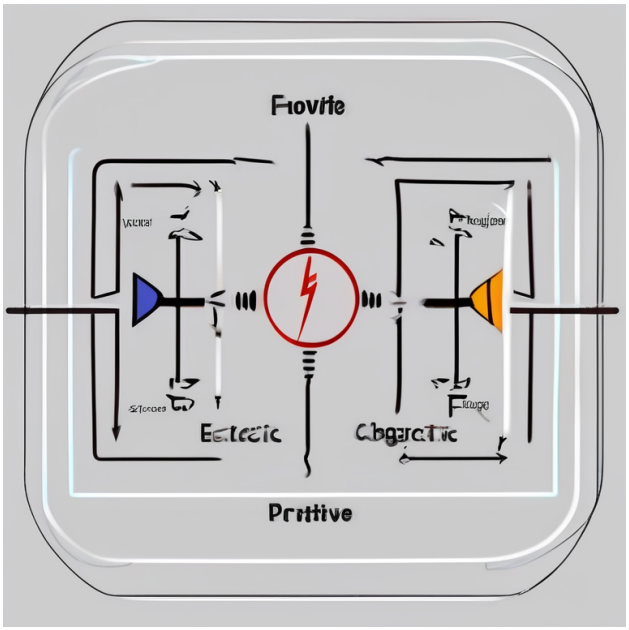
$120\,240\,\Omega$

$I = \frac{V}{R} IV = I \cdot R$

$$I = \frac{120}{240\,\Omega}$$

$$I = 0.5$$

0.5



- $I = I_1 = I_2 = I_3 = \ldots$
- $V = V_1 + V_2 + V_3 + \ldots$
- $R = R_1 + R_2 + R_3 + \ldots$

$12\,R_2 = 20\,\Omega R_1 = 10\,\Omega$

$$R = R_1 + R_2 = 10\,\Omega + 20\,\Omega = 30\,\Omega$$

$$I = \frac{V}{R} = \frac{12}{30\,\Omega} = 0.4$$

0.4

$$V_1 = I_1 \cdot R_1 = 0.4 \times 10\,\Omega = 4$$

$$V_2 = I_2 \cdot R_2 = 0.4 \times 20\,\Omega = 8$$

$V_1 + V_2 = 4 + 8 = 12$

- $V = V_1 = V_2 = V_3 = \ldots$
- $I = I_1 + I_2 + I_3 + \ldots$
- $\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \ldots$

$R = \frac{R_1 R_2}{R_1 + R_2}$

$12\,R_2 = 20\,\Omega R_1 = 10\,\Omega$

$$\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} = \frac{1}{10\,\Omega} + \frac{1}{20\,\Omega} = \frac{2}{20\,\Omega} + \frac{1}{20\,\Omega} = \frac{3}{20\,\Omega}$$

$$R = \frac{20}{3}\,\Omega \approx 6.67\,\Omega$$

$10\,\Omega 6.67\,\Omega$

$$V_1 = V_2 = V = 12$$

$$I_1 = \frac{V_1}{R_1} = \frac{12}{10\,\Omega} = 1.2$$

$$I_2 = \frac{V_2}{R_2} = \frac{12}{20\,\Omega} = 0.6$$

$$I = I_1 + I_2 = 1.2\ + 0.6\ = 1.8$$

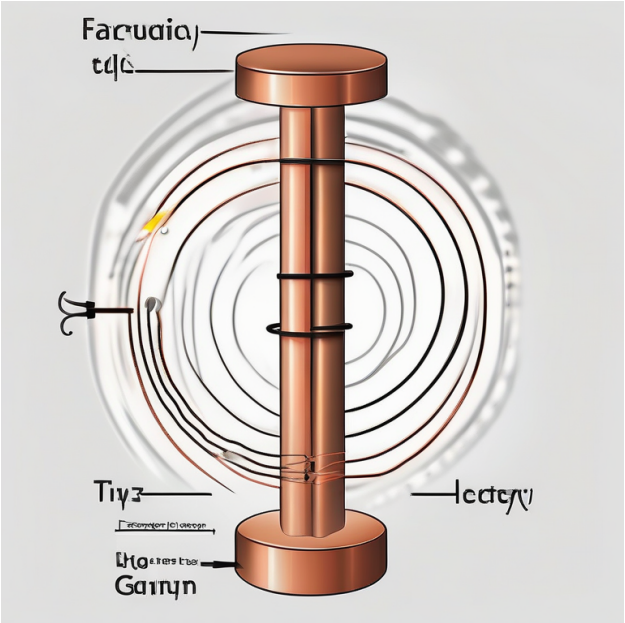
$I = \frac{V}{R} = \frac{12}{20/3\,\Omega} = 12 \times \frac{3}{20}\ = \frac{36}{20}\ = 1.8$

-
-
-
-

$$\Phi_B V \mathcal{E}$$

$$\mathcal{E} = -\frac{d\Phi_B}{dt}$$

$$\theta AB \theta AB \Phi_B = B \cdot A \cdot \cos\theta \Phi_B = \int \vec{B} \cdot d\vec{A} \Phi_B$$



$$0.02\,^2tB(t) = 0.1t$$

$$\Phi_{B,}(t) = B(t)\cdot A = (0.1t)\cdot(0.02) = 0.002t\cos\theta = 1\theta = 0\Phi_{B,} = B\cdot A\cdot\cos\theta$$

$$\Phi_B(t) = 100\cdot(0.002t) = 0.2t\,N = 100\Phi_B = N\cdot\Phi_{B,}N$$

$$\mathcal{E} = -\tfrac{d\Phi_B}{dt}$$

$$\frac{d\Phi_B}{dt} = \frac{d}{dt}(0.2t) = 0.2\,/$$

$$\frac{d\Phi_B}{dt} = 0.2$$

$$\mathcal{E} = -0.2$$

$$0.2$$