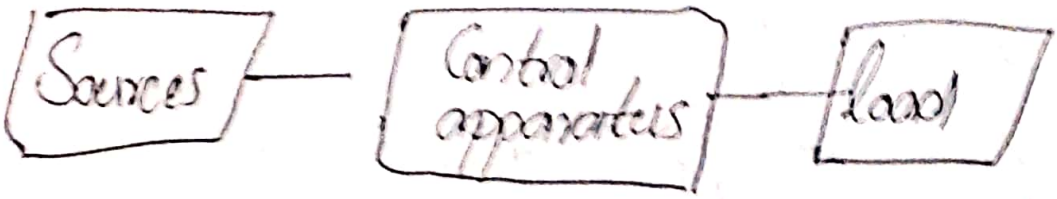
20/08/19

Basics of Electrical Engg..

B.D of Electrical System



* **Ohm's law:**

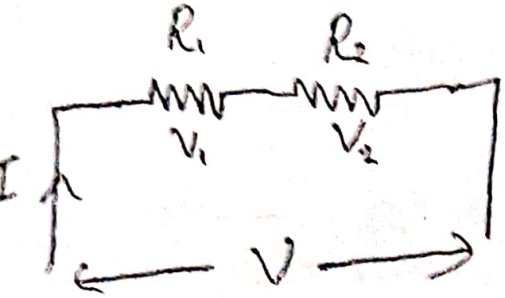
Current flowing through a resistance $\propto$ p.d across the ends.

$$I \propto V$$

$$I = \frac{1}{R} \times V$$

$$\boxed{V = IR}$$

* **Voltage Division Rule**



$$V = V_1 + V_2$$

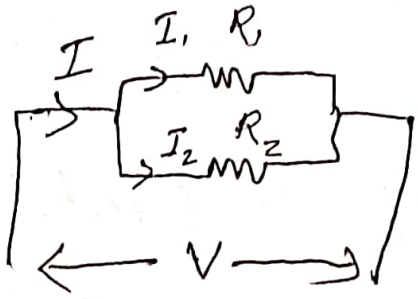
$$V = IR_1 + IR_2$$

$$= I(R_1 + R_2)$$

$$\left\{ V_1 = \left(\frac{V}{R_1 + R_2}\right) \times R_1 \right\}$$

$$\left\{ V_2 = \left(\frac{V}{R_1 + R_2}\right) R_2 \right\}$$

* Current Division Rule



$$I = I_1 + I_2$$

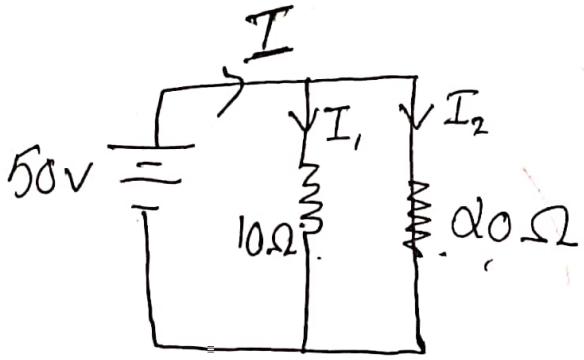
$$= \frac{V}{R_1} + \frac{V}{R_2}$$

$$= V\left(\frac{1}{R_1} + \frac{1}{R_2}\right)$$

$$I_1 = \frac{V}{R_1} = \frac{I}{\left(\frac{1}{R_1} + \frac{1}{R_2}\right)} \times R_1 = \left(I \times \frac{R_2}{R_1 + R_2}\right)$$

$$I_2 = \left(I \times \frac{R_1}{R_1 + R_2}\right)$$

?



$I = I_1 + I_2$

$V = I \times R$.

$\frac{5\cancel{0}}{2\cancel{0}} \times 3$

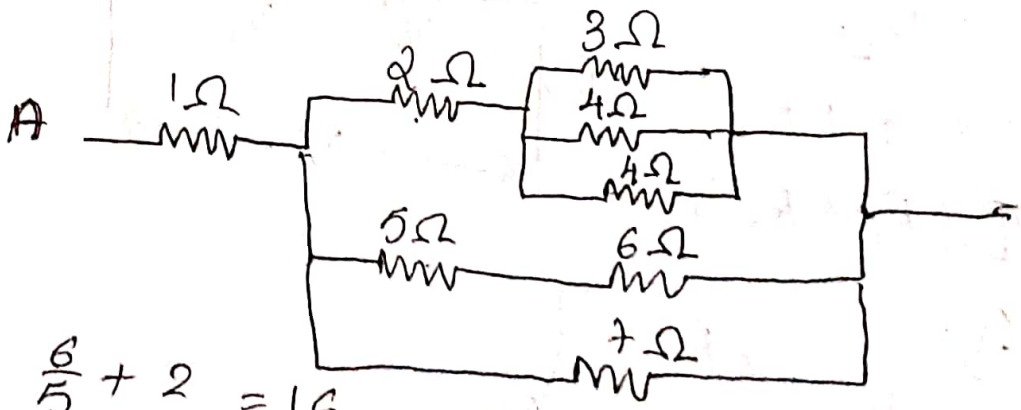
$R_{11} = \frac{10 \times 20}{30}$

~~2.5~~ $\frac{20}{3}$.

2.5×3

$\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2}$

?



$\frac{1}{3} + \frac{1}{4} + \frac{1}{4}$

$\frac{1}{3} + \frac{1}{2}$

$\frac{2 \times 3}{5}$

$\frac{6}{5}$.

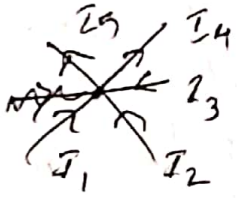
$\frac{6}{5} + 2 = \frac{16}{5}$

$\frac{5}{16} + \frac{1}{11} + \frac{1}{7}$

22/05/19 Circuit Analysis

* Kirchoff's Laws

→ Sum of Currents entering a pnt = Sum of Currents leaving the pnt

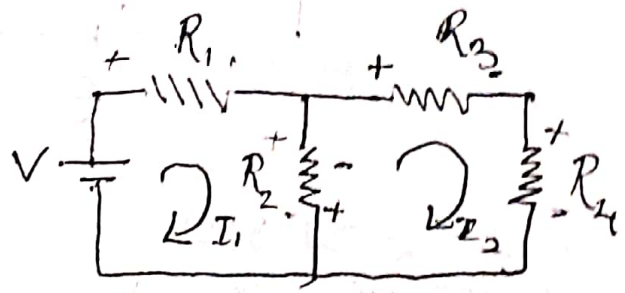


$I_1 + I_2 + I_3 = I_4 + I_5$

→ $\Sigma emf + \Sigma IR = 0$

1) Mesh analysis

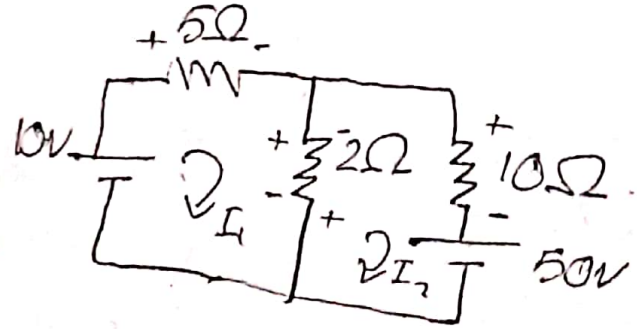
mesh are loop which does not contain any other loop.



$V - I_1R_1 - (I_1 - I_2)R_2 = 0$ - Mesh ①

$-R_2(I_2 - I_1) - R_3 \times I_2 - R_4 \times I_2 = 0$

?



$10 - I_1 \times 5 - (I_1 - I_2)2$

$10 - 5I_1 - 2I_1 + 2I_2$

$10 - 7I_1 + 2I_2 = 0$

$-10(I_2) - 50$

$-10I_2 - 50 - 2I_2 + 2I_1 = 0$

$12I_2 - 50 + 2I_1 = 0$

$-10(I_2) - 50 - (I_2 - I_1)$

$-2I_2 + 2I_2 =$

$2I_1 - 12I_2 = 60$