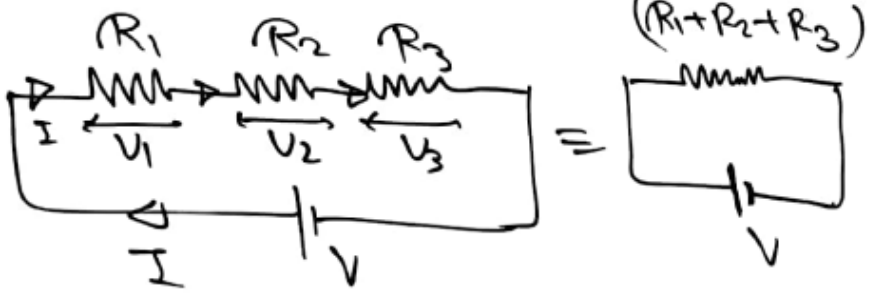
⇒ Circuit problem

⇒ (P) Series Connection

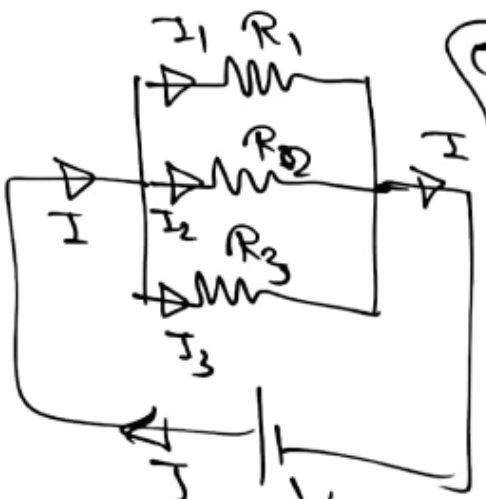


$$V = V_1 + V_2 + V_3$$

$$R_{eq} = R_1 + R_2 + R_3$$

(#) Current must be same in all resistor.

& Parallel Connection



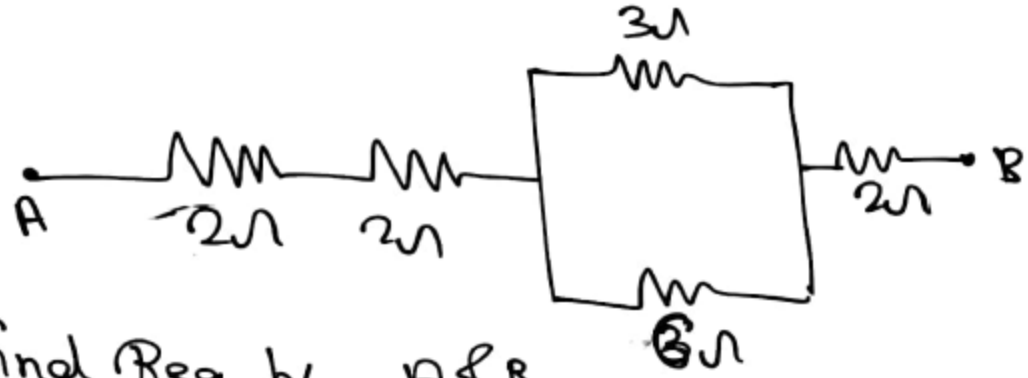
"Potential Across All the Resistance is Same"

$$I = I_1 + I_2 + I_3$$

$$\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$$

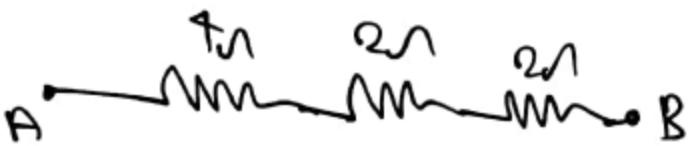
⇒ Circuit problem

H.C.V



Find Req b/w A & B

≡



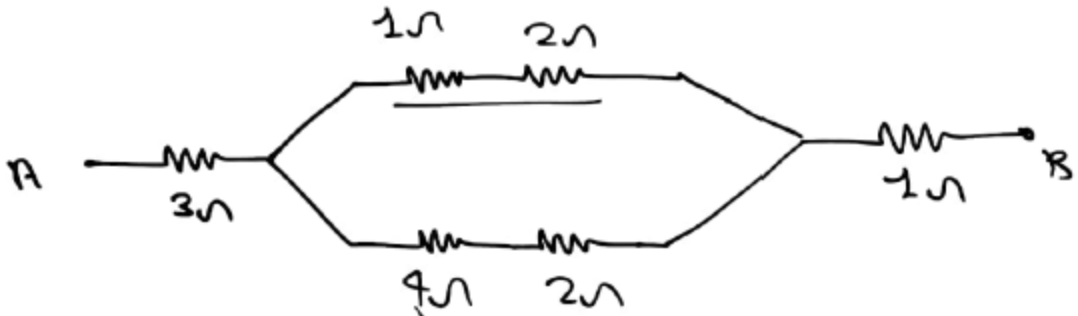
$R_{AB} = 8\,\Omega$

$$\frac{1}{R_{eq}} = \frac{1}{3} + \frac{1}{6} = \frac{2+1}{6} = \frac{3}{6} = \frac{1}{2}$$

$R_{eq} = 2\,\Omega$

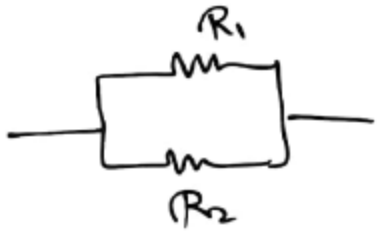
⇒ Circuit problem

⇒ Find R_{eq} b/w A & B



$$R_{eq} = \frac{3\times 6}{3+6} = \frac{18}{9} = 2\Omega$$

$$R_{AB} = 6\Omega$$



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

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

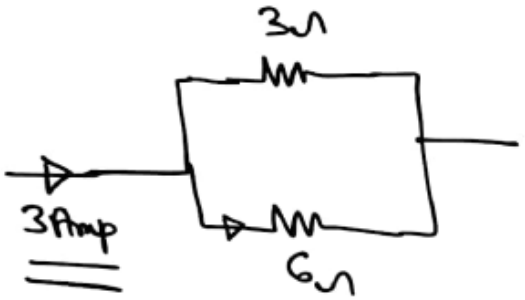
$$R_{eq} = \frac{R_1 R_2}{R_1 + R_2}$$

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

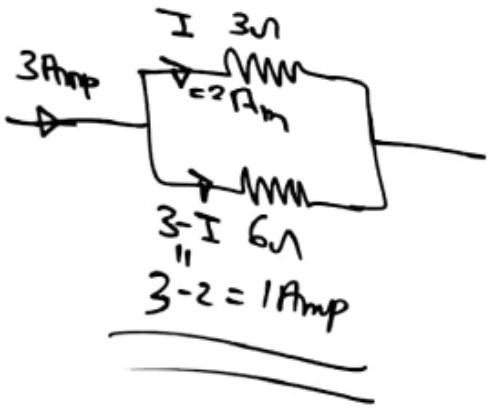
⇒ Circuit problem

Q3:

Find Current in 3Ω & 6Ω resistor.



Sol) Point① - Potential drop across 3Ω & 6Ω are same.



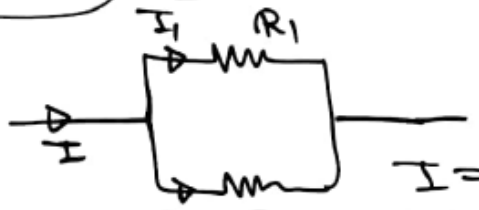
$I \times 3 = (3-I) \times 2$

$I = 6 - 2I$

$3I = 6$

$I = 2$ Amp

In General



$I = I_1 + I_2$

$I_2 = I - I_1$

⇒ Smart way :-

$I_1 R_1 = I_2 R_2$

$\frac{I_1}{I_2} = \frac{R_2}{R_1}$

$\frac{I_1}{I - I_1} = \frac{R_2}{R_1} \Rightarrow I_1 R_1 = I R_2 - I_1 R_2$

$I_1 R_1 + I_1 R_2 = I R_2$

$I_1 (R_1 + R_2) = I R_2$

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

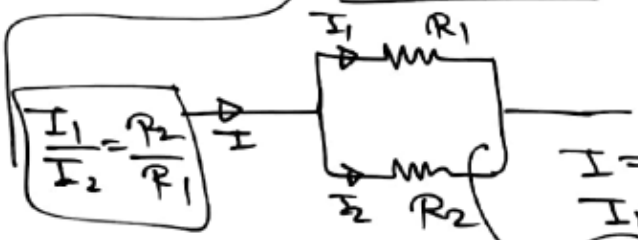
⇒ Circuit problem

Q3: Find Current in 3Ω & 6Ω resistor.

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

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

In General



$\frac{I_1}{I_2} = \frac{R_2}{R_1}$

$I = I_1 + I_2$

$I_2 = I - I_1$

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

⇒ **Smart way:**

$I_1 R_1 = I_2 R_2$

$\frac{I_1}{I_2} = \frac{R_2}{R_1}$

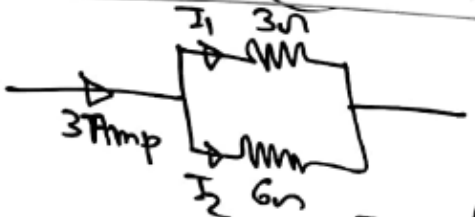
$\frac{I_1}{I-I_1} = \frac{R_2}{R_1} \Rightarrow I_1 R_1 = I R_2 - I_1 R_2$

$I_1 R_1 + I_1 R_2 = I R_2$

$I_1 (R_1+R_2) = I R_2$

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

Q)



$I_1 = \left(\frac{6}{3+6}\right) \times 3$

$I_1 = \frac{6}{9} \times 3 = 2\,\text{Amp}$

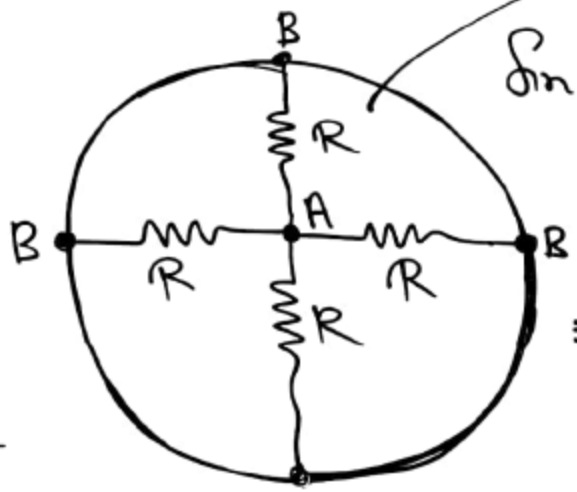
$I_2 = \left(\frac{3}{3+6}\right) \times 3 = 1\,\text{Amp}$

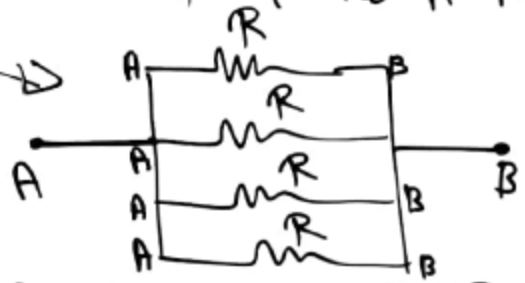
Equivalent Resistance of Ckt

Q) Find R_{eq} b/w A & B

both are same

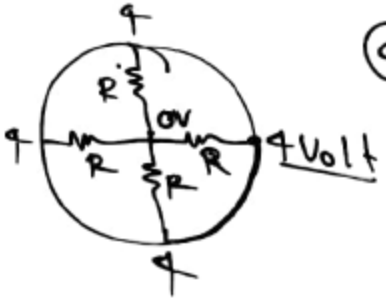
Find R_{eq} b/w A & B

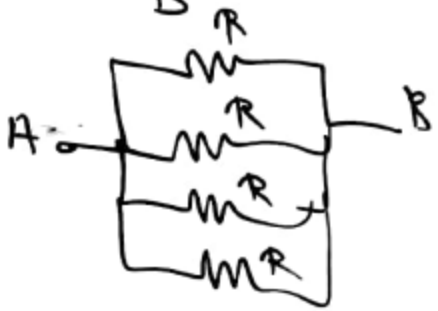




(a) $\frac{3R}{4}$ (b) $R/4$ (c) $4R$ (d) N.O.T.

(a) $\frac{R}{2}$ (b) $4R$ (c) $\frac{R}{4}$ (d) N.O.T



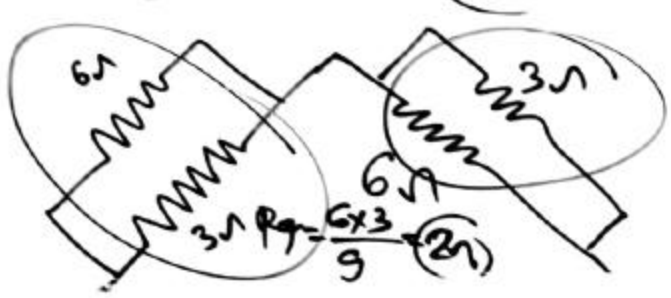


$$\frac{1}{R_{eq}} = \frac{1}{R} + \frac{1}{R} + \frac{1}{R} + \frac{1}{R}$$

$$\frac{1}{R_{eq}} = \frac{1+1+1+1}{R} = \frac{4}{R}$$

$$R_{eq} = R/4$$

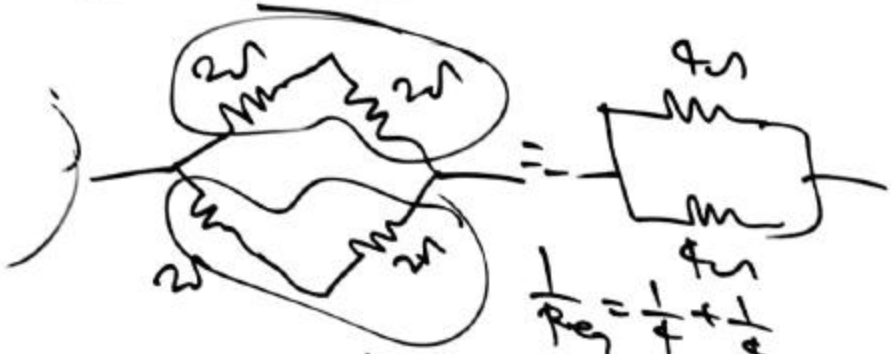
Equivalent resistance of Ckt # Short Circuit



(i) Req b/w A & B when Swich is open

(ii) Req b/w A & B when Swich is closed.

Sol (i) Open



(ii) $R_{eq} = 0$ when S is closed

$\frac{1}{R_{eq}} = \frac{2}{x_2} = \frac{1}{2}$ $R_{eq} = 2\Omega$