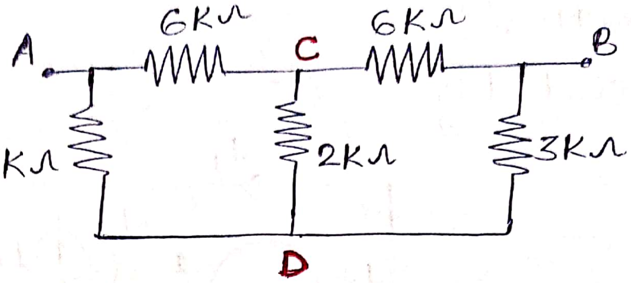
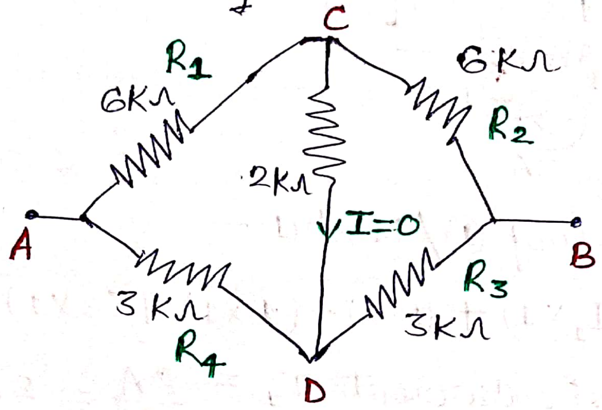
SOLUTION-9:

By circuit (Figure-9)—

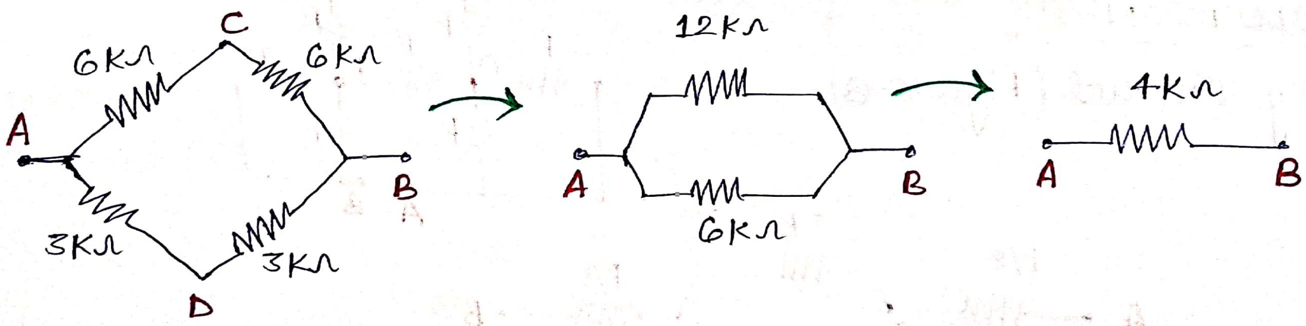


The given circuit is balanced wheatstone bridge because ~~(for wheatstone bridge~~

$$\frac{R_1}{R_2} = \frac{R_4}{R_3} = 1$$



Hence there will be no current through branch CD, so we can neglect the branch.



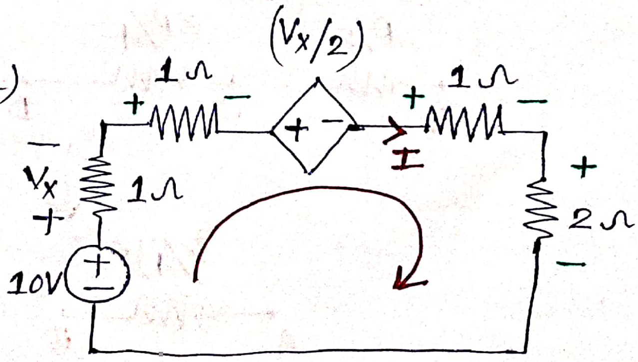
$\therefore R_{AB} = 4K\Omega$

SOLUTION-10:

By circuit (Figure-10)— $V_x = (I \times 1)$

$V_x = I$

applying KVL in the loop,



$$-10 + V_x + (I \times 1) + \frac{V_x}{2} + (I \times 1) + (I \times 2) = 0$$

$$-10 + I + I + \frac{I}{2} + I + 2I = 0$$

$$5.5I = 10$$

$$\therefore I = 1.81\ A$$

SOLUTION—5:

By circuit (Figure 5)— $I_x = 10\,A$

$\therefore$ current through variable current source $5I_x = 50\,A$

$\therefore I_y = I_x + 5I_x$ (By KCL)

$= 10 + 50 = 60\,A$

Now voltage across variable current source $I_y = V_{I_y} = 75$ Volt

$\therefore$ Power deliver by $(5I_x) = 125 \times 50 = 6250$ Watt

$\therefore$ Power absorb by 50V voltage source $= 50 \times 60 = 3000\,W$

$\therefore$ Power absorb by $(I_y) = 75 \times 60 = 4500\,W$

$\therefore$ Power deliver by 10A current source $= 175 \times 10 = 1750\,W$

$\therefore$ Power absorb by 50V voltage source $= 50 \times 10 = 500\,W$

Total Power absorb $= 8000\,W$
Total Power deliver $= 8000\,W$ conservation of energy

SOLUTION-3 :

By circuit —
(Figure 4)

Principle Node

No. of primary Node = 2

No. of secondary Node = 2

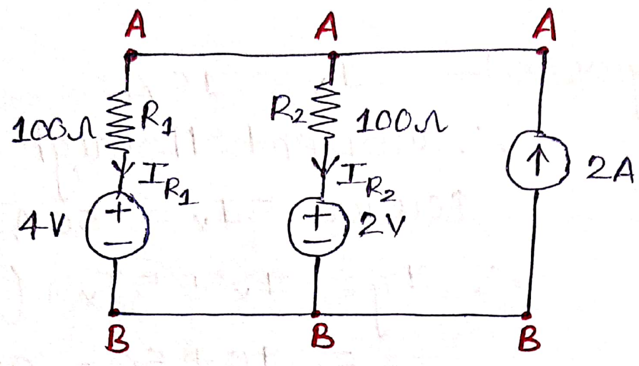
Simple Node

No. of loop = 3

No. of branches = 3

No. of Meshes = 2

circuit (Figure 4) —



By using KCL at node A — $I_{R_1} + I_{R_2} = 2$

$$\left(\frac{V_A - 4}{100}\right) + \left(\frac{V_A - 2}{100}\right) = 2$$

$$2V_A = 206$$

$$\therefore V_A = 103 \text{ Volt}$$

$$\therefore I_{R_1} = \left(\frac{103-4}{100}\right) = 0.99A$$

$$\therefore I_{R_2} = \left(\frac{103-2}{100}\right) = 1.01 A$$

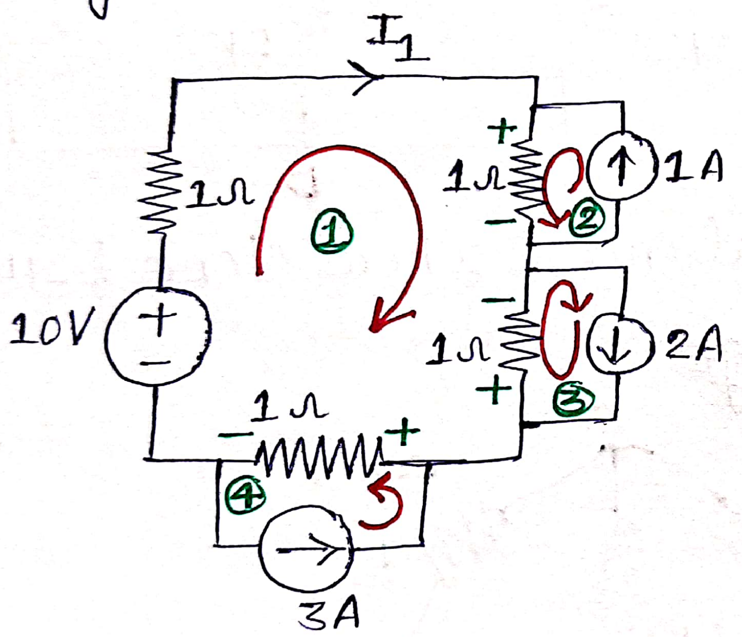
∴ Power absorbed by resistor R_1 & R_2 respectively —

$$P_{R_1} = I_{R_1}^2 \times R_1 = 0.99^2 \times 100 = 98.01 \text{ Watt}$$

$$P_{R_2} = I_{R_2}^2 \times R_2 = 1.01^2 \times 100 = 102.01 \text{ Watt}$$

SOLUTION-7:

By circuit (figure-7) —



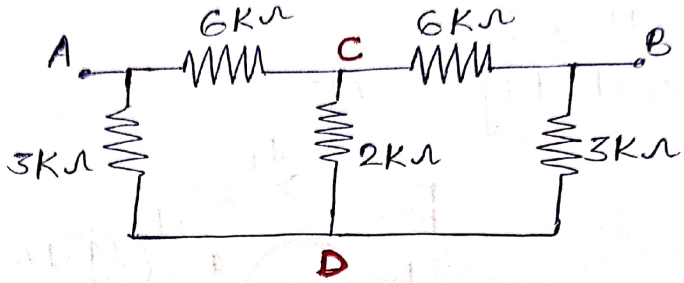
applying KVL in loop ① / Mesh ① —

$$-10 + 4(I_1 \times 1) + (1 \times 1) - (2 \times 1) + (3 \times 1) = 0$$

$$\therefore \text{ Current } I_1 = \frac{8A}{4} = 2A$$

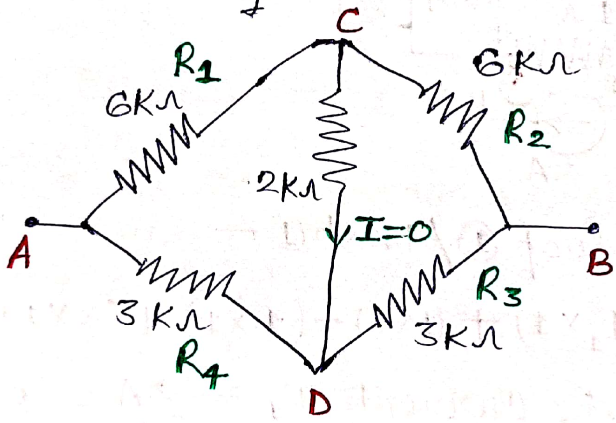
SOLUTION-9:

By circuit (Figure-9) —

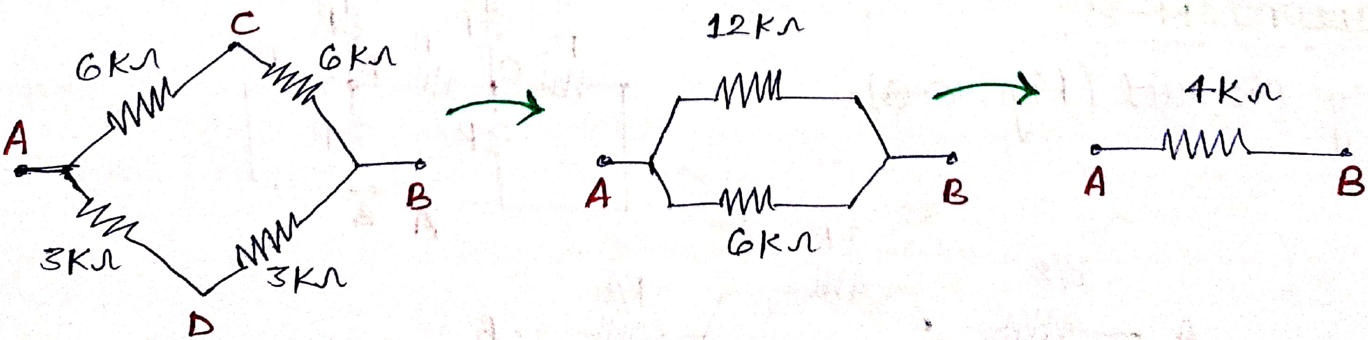


The given circuit is balanced wheatstone bridge because ~~for wheatstone bridge~~

$$\frac{R_1}{R_2} = \frac{R_4}{R_3} = 1$$



Hence there will be no current through branch CD, so we can neglect the branch.



$\therefore$ $R_{AB} = 4K\Omega$