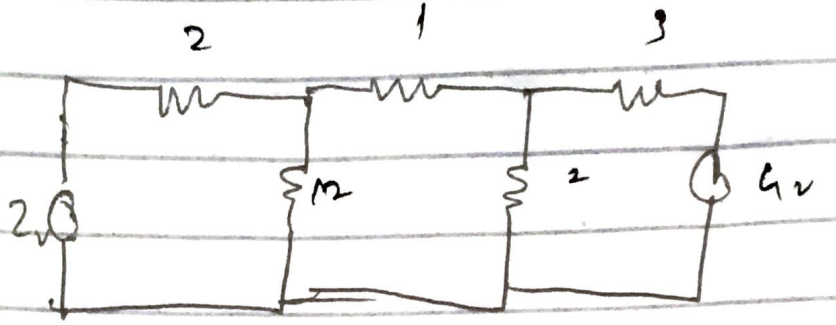
Name = Hassam Khan.

ID = 6620

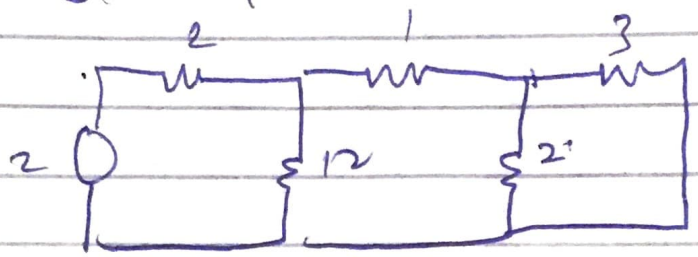
Submit to = Engr. Waleed Jan

Question NO#1



sol :→

Using Superposition theorm.



VAB =>

using Nodel analysis

$$\frac{V1-2}{2} + \frac{V1}{12} + \frac{V1-V2}{1} = 0$$

$$6V1 - 12 + 1V1 + 12V1 - 12V2 = 0$$

$$19V1 - 12V2 = 12 \rightarrow (1)$$

$$\frac{V2-V1}{1} + \frac{V2}{2} + \frac{V2}{3} = 0$$

$$6V2 - 6V1 + 3V2 + 2V2 = 0$$

$$-6V1 + 11V2 = 0$$

$$V2 = \frac{6V1}{11} \rightarrow (2)$$

put in (1)

$$19V1 - 12\left(\frac{6V1}{11}\right) = 12$$

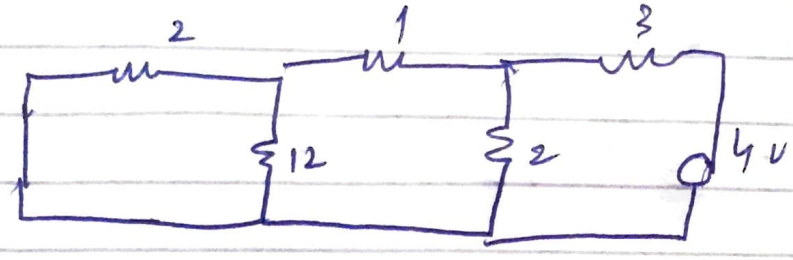
$V_1 = 0.9835\,V$

$V_2 = 0.5955\,V$

$$V_{AB}' = V_2 - 0 = 0.5955\,V$$

Now

2V is short ckt.

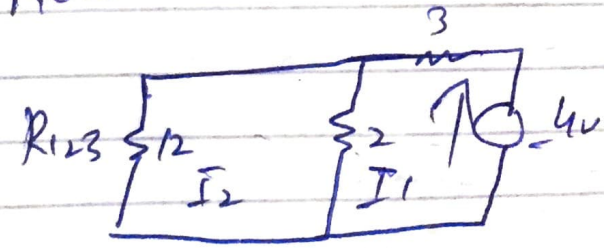


$R_{12} = 2 \| 2$

$R_{123} = 2 \| 2 + 1$

$R_{123} = 1.5 + 1 = 2.5\,\Omega$

Now



$V_{AB}' = I_1(2)$ — (*)

$$I = \frac{4}{2.5 \| 2 + 3} = \frac{4}{4.1\,\Omega} = 0.9756\,A$$

using current devision.

Rule.

(3)

$$I_1 = \left(\frac{2.5}{2+2.5}\right) I = 0.5405\,A$$

$$V''_{AB} = I_1(2) = (0.5405)(2)$$

$$= 1.081\,V$$

So

Net voltage

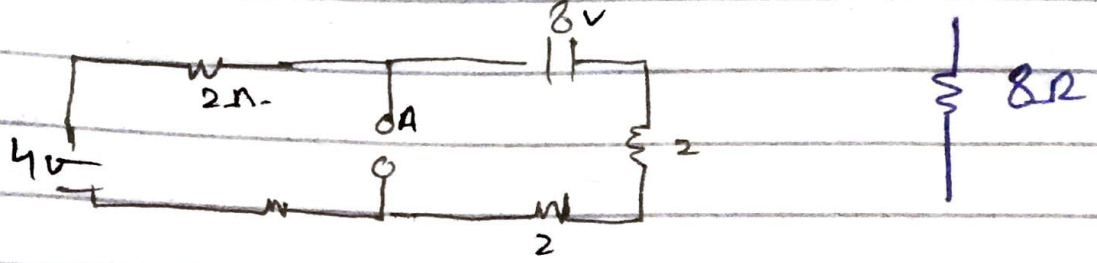
$$V_{AB} = V'_{AB} + V''_{AB}$$

$$= 0.525 + 1.081\,V$$

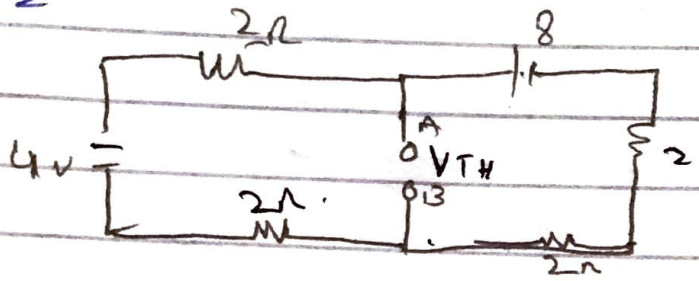
$$\boxed{V_{AB} = 1.6035\,V}$$

Question No # 2.

Step 1.



Step 2



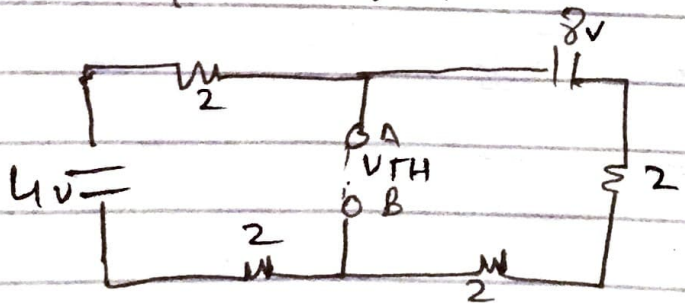
$$4 - 2I - 8 - 2I - 2I - 2I = 0$$

$$-8I - 4 = 0$$

$$I = \frac{4}{8} \Rightarrow \boxed{I = -\frac{1}{2} A}$$

Step 3

To find VTH.



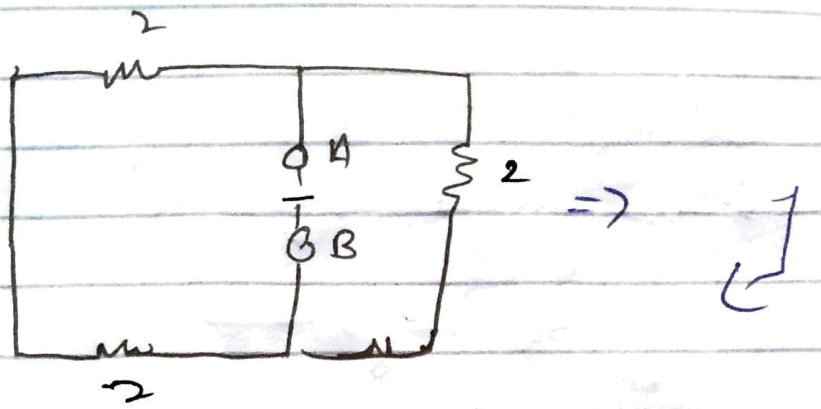
$$4 - 2I - VTH - 2I = 0$$

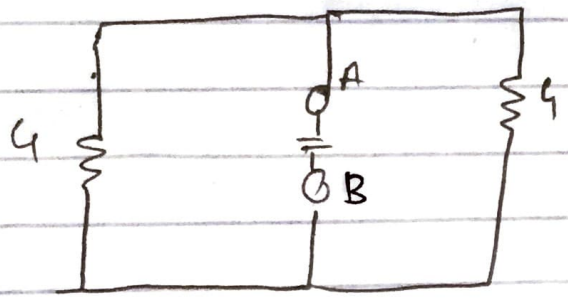
$$VTH = 4 + 4$$

$$VTH = -4\left(\frac{1}{2}\right) + 4$$

$$VTH = 2 + 4 = 6v.$$

Now Find RTH.

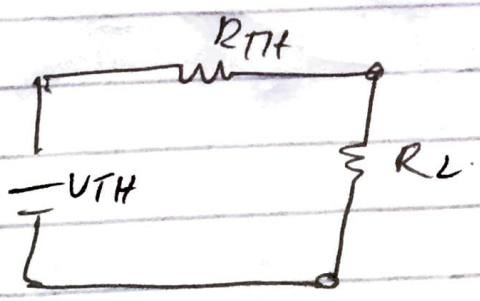




$$R_{TH} = \frac{4 \times 4}{4+4} = \frac{16}{8}$$

$$\boxed{R_{TH} = 2\,\Omega}$$

Now step 5

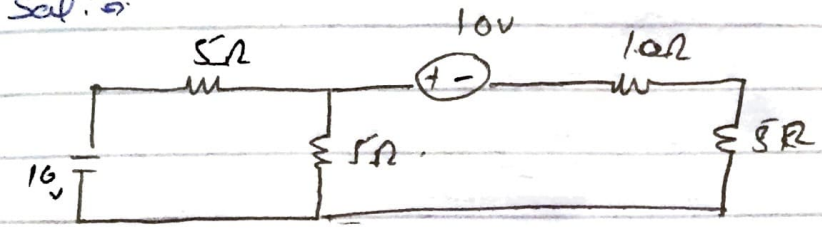


$$I = \frac{V_{TH}}{R_{TH}+R_L} = \frac{6}{2+8} \Rightarrow \frac{6}{10}$$

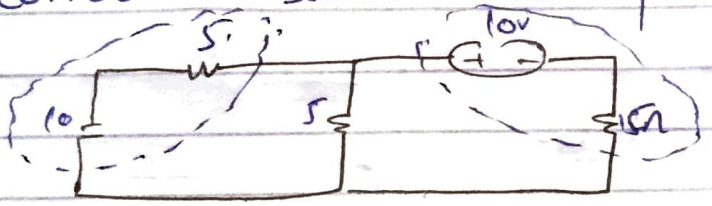
$$\boxed{= 0.6\ A}$$

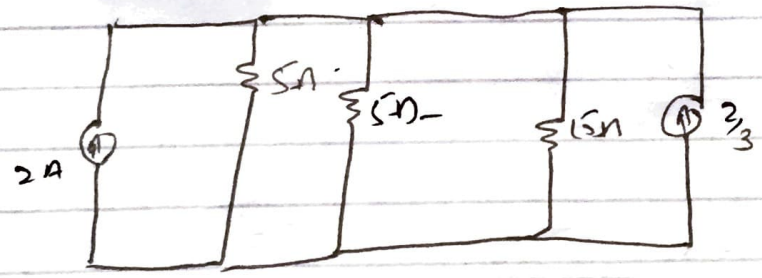
Question no # 3.

Sol:-



The terminal of the 10v source is placed to the left because the current source was pointing left.

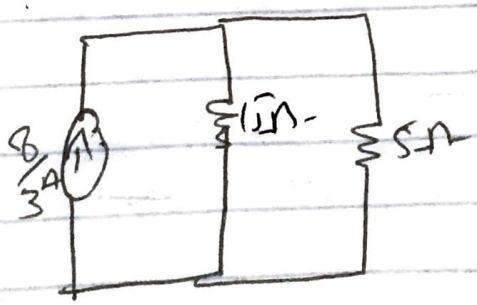




$$I = \frac{10}{5} = \boxed{2A}$$

$$I = \frac{10}{15} = \boxed{\frac{2}{3}A}$$

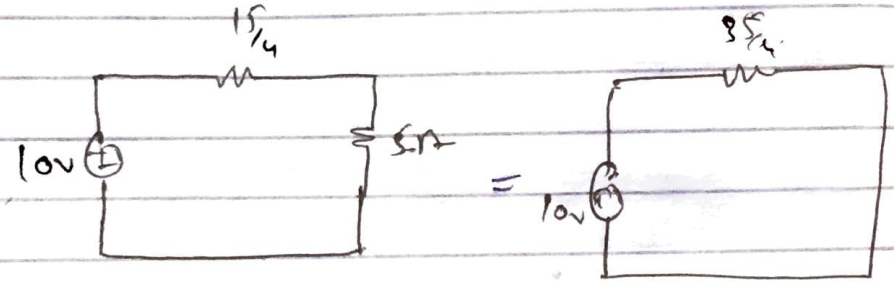
Now



$$\frac{1}{R_{eq}} = \frac{1}{5} + \frac{1}{15}$$

$$= \frac{3+1}{15} = \frac{4}{15}$$

$$\boxed{R_{eq} = \frac{15}{4}\ \Omega}$$



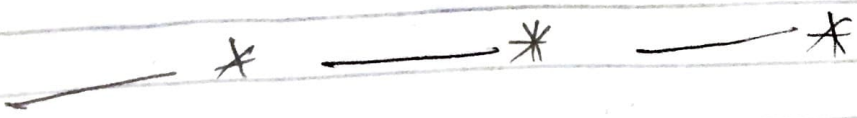
$$\frac{8}{3} \times \frac{15}{4} = 10V$$

$$\frac{15}{4} + 5 = \frac{15+20}{4} = \boxed{\frac{35}{4}}$$

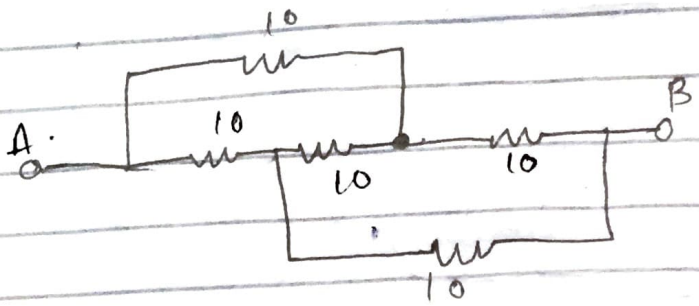
Now.

$$i = \frac{10}{\frac{35}{4}} = \frac{10 \times 4}{35}$$

$$\boxed{= \frac{8}{7} A}$$ Ans.



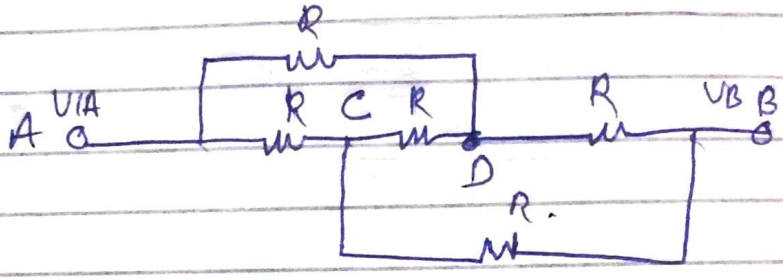
Question 4 A.



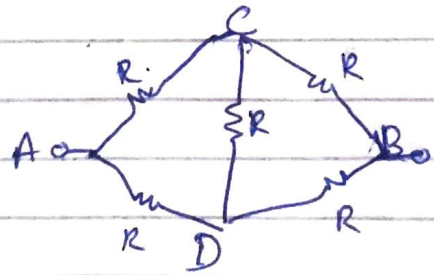
Sol.

A = VA

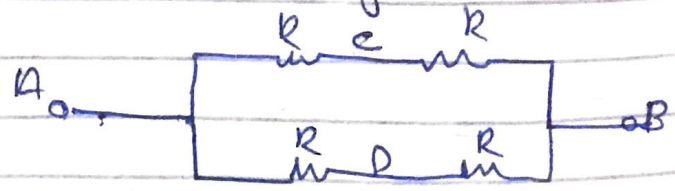
B = VB



Now Modified the circuit



Circuit is balanced now from wheeat stone bridge.



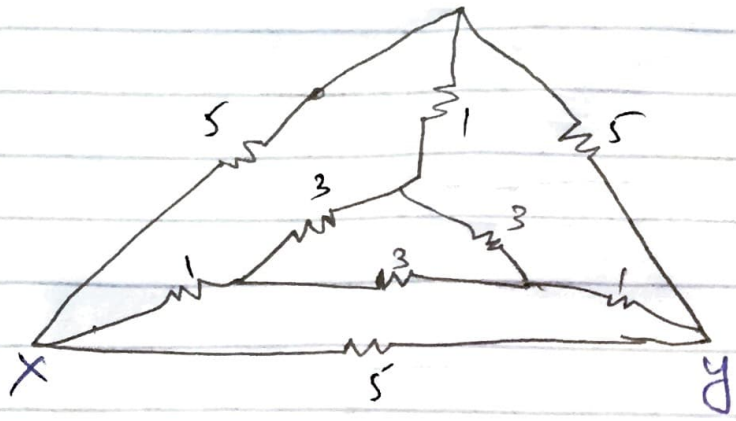
Now

$$R_{eq} = \frac{2R \times 2R}{2R + 2R} = \frac{2(10) \times 2(10)}{2(10+2)10}$$

$$R_{eq} = \frac{400}{40} = 10$$

$$\boxed{R_{eq} = 10} \quad \text{Ans}$$

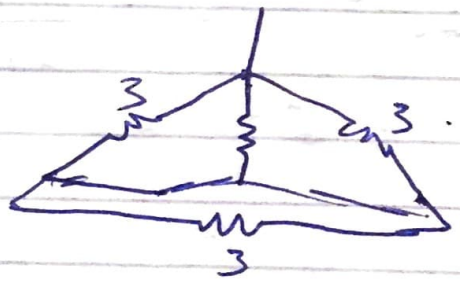
Question 4b



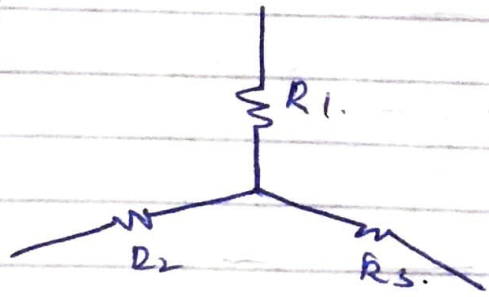
$$R_1 = \frac{3\times3}{3+3+3} = \frac{9}{9} = 1$$

$R_2 = 1$

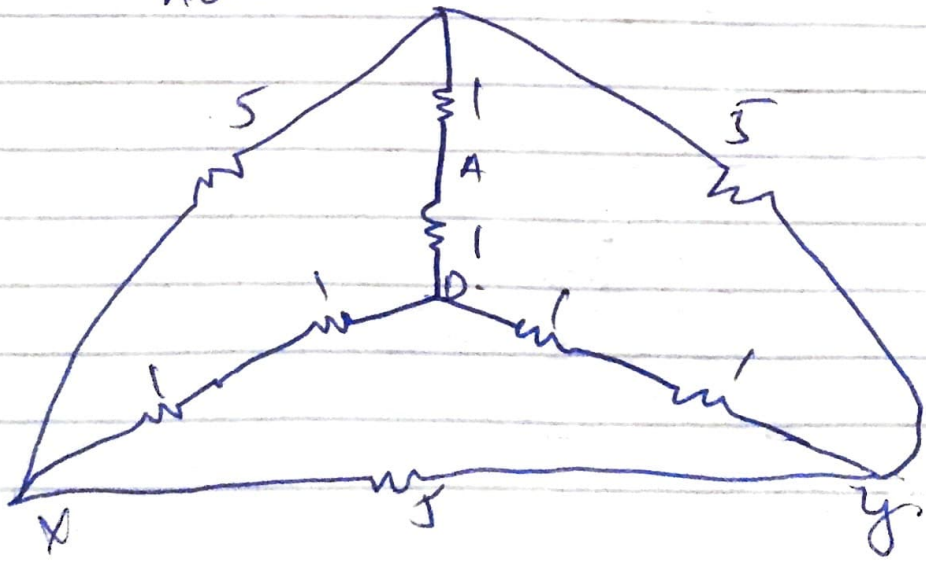
$R_3 = 1$.

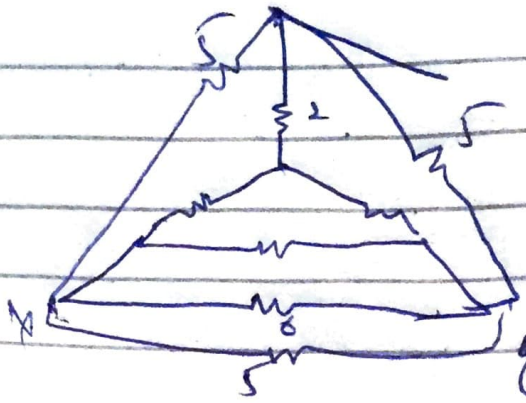


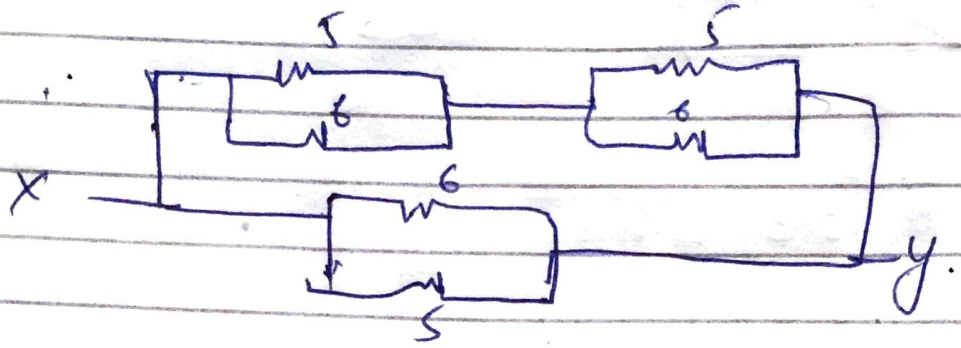
$\Delta \rightarrow y$



Now.





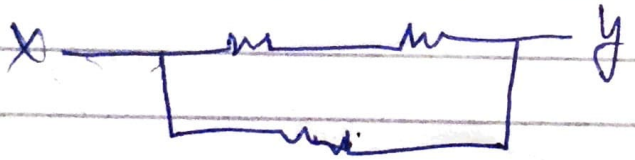


6 Req

$= 5 // R_6 = 5 // 6 = \frac{5 \times 6}{5+6} = 30/11$

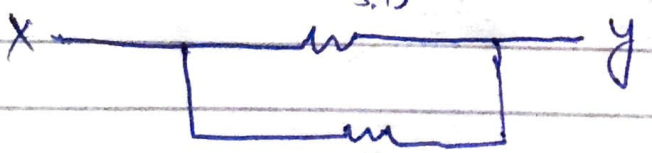
$R_{eq} = \frac{30}{11} = 2.727\Omega$.

$2.727 + 2.727\Omega$.



2.727

5.45



2.27

1.8717

$= \frac{5.45 \times 2.727}{5.45 + 2.727}$

$R_{eq} = 1.81717\Omega$.