

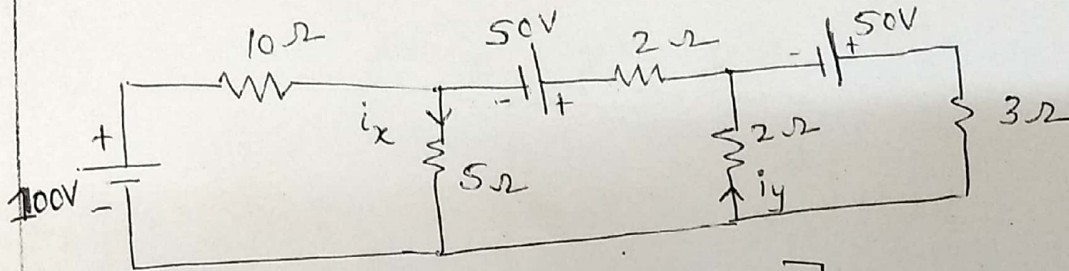
# CIRCUIT ANALYSIS ASSIGNMENT

## Mesh & Node Analysis

Mrs. G. SUMITHRA

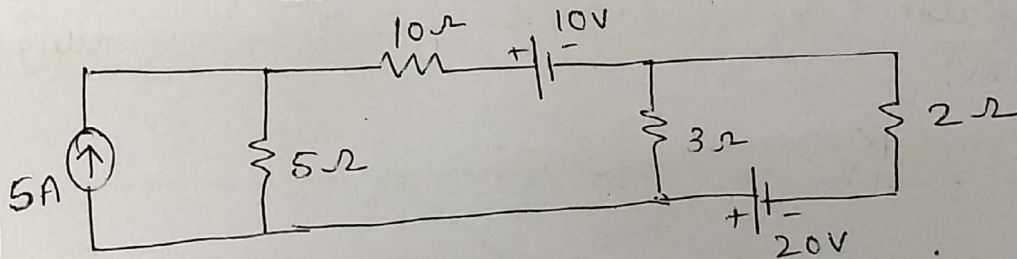
3

- ① Determine the currents  $i_x$  &  $i_y$  using mesh.



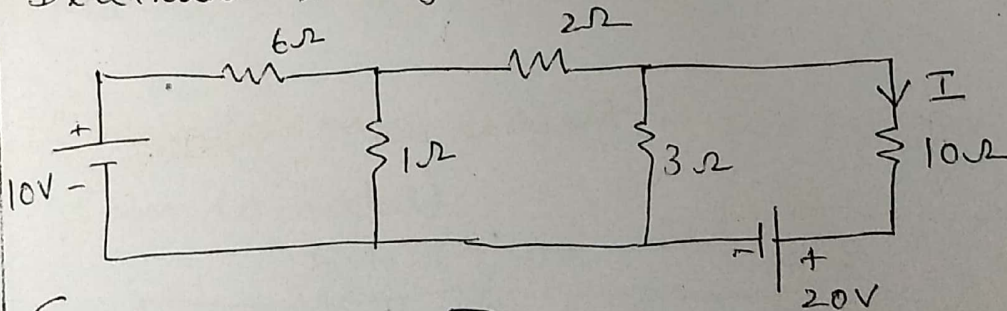
[Ans:  $i_x = -3.87A$      $i_y = 0.51A$ ]

- ② Find the mesh current in & the voltage across,  $2\Omega$ .



[Ans:  $I_2 = 5A$      $V_{2\Omega} = 10V$ ]

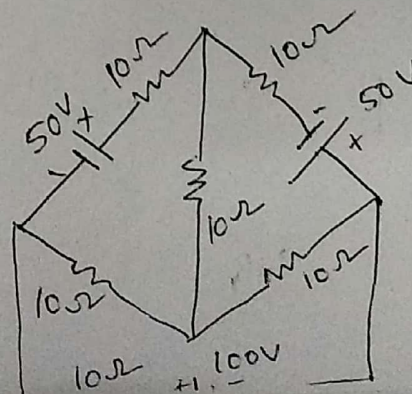
- ③ Determine  $I$  by mesh analysis & nodal analysis



[Ans:  $I = -1.68A$ ]

- ④ Determine the current supplied by the 100-V battery in the circuit.

[Ans:  $7.5A$ ]

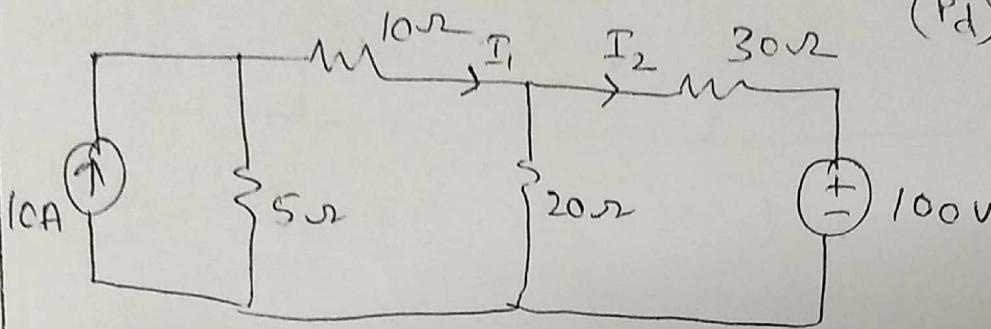


5) Solve for  $I_1$  &  $I_2$  using mesh & nodal analysis.

Verify

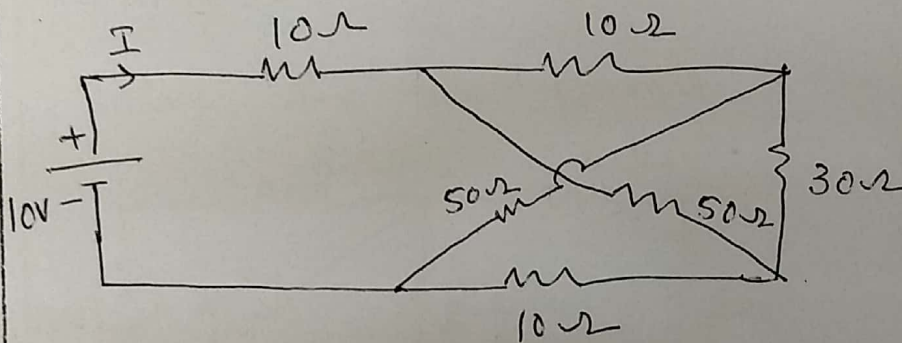
$$\sum \text{power from Sources } (P_s) = \sum \text{power dissipated in all resistances } (P_d)$$

4



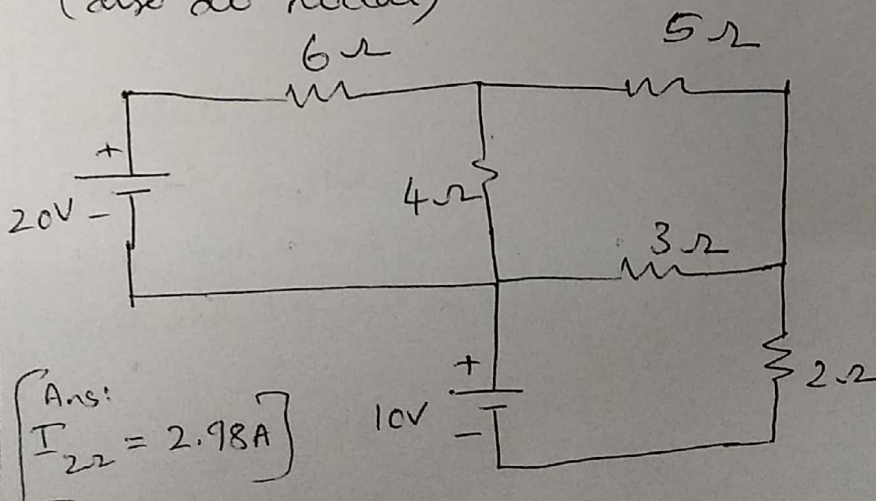
Ans:  $I_1 = 0.37 \text{ A}$ ,  $I_2 = -1.85 \text{ A}$ ,  $P_s = 666.48 \text{ W}$   
 $P_d = 666.45 \text{ W}$

6) Determine the current  $I$  supplied by the battery. (mesh)



Ans:  $I = 0.3 \text{ A}$

7) Solve for mesh current in  $2\Omega$  resistor. (also do nodal)

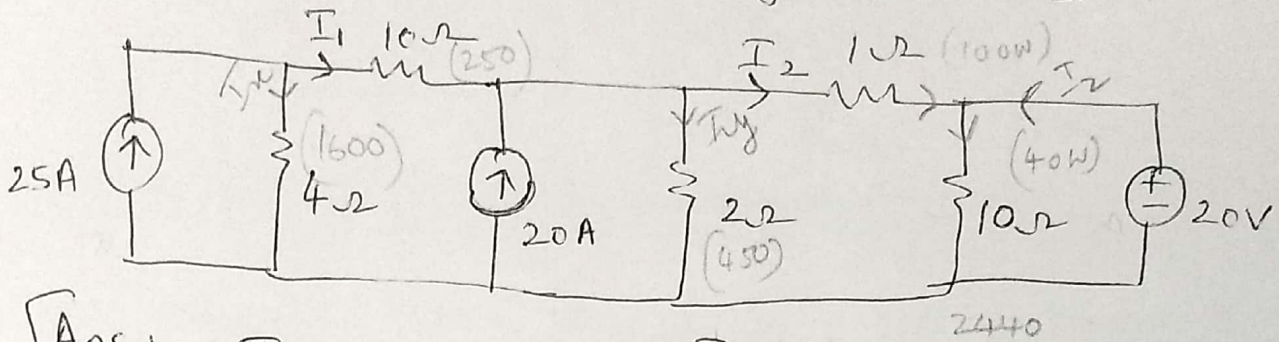


Ans:  
 $I_{2\Omega} = 2.98 \text{ A}$



⑧ Find mesh  $I_1$  &  $I_2$ . [Verify with nodal]

5

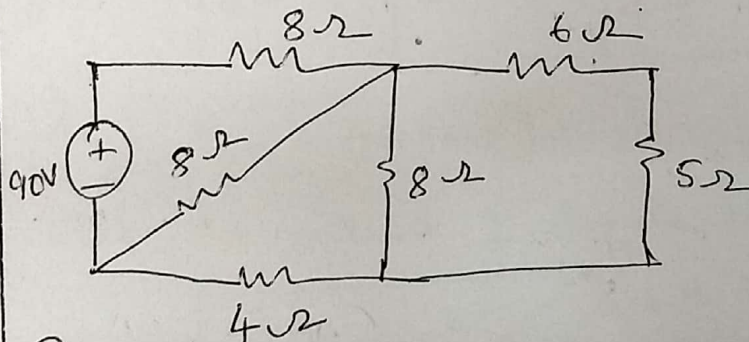


[Ans:  $I_1 = 5A$   $I_2 = 10A$ ]

Calculate the power supplied by each source to the entire network. Determine if all sources supply power.

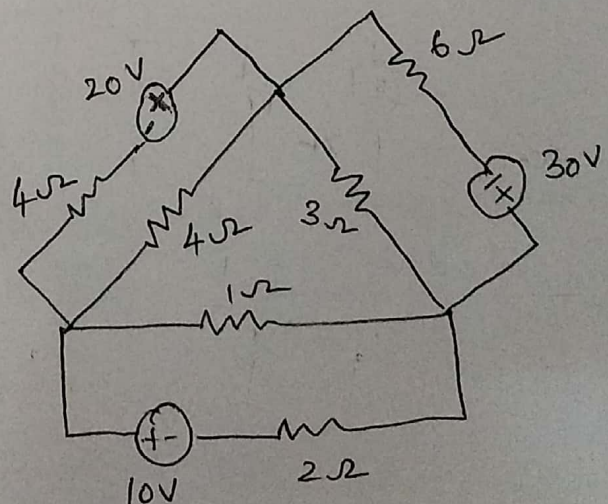
[Ans:  $P_{25A} = 2000W$ ,  $P_{20A} = 600W$ ,  $P_{20V} = -160W$ ]  
2440W

⑨ Solve for the current in the  $5\Omega$  resistor



[Ans:  $I_{5\Omega} = 1.5A$ ]


⑩ Calculate the current in the  $2\Omega$  resistor & power delivered by 30V source.



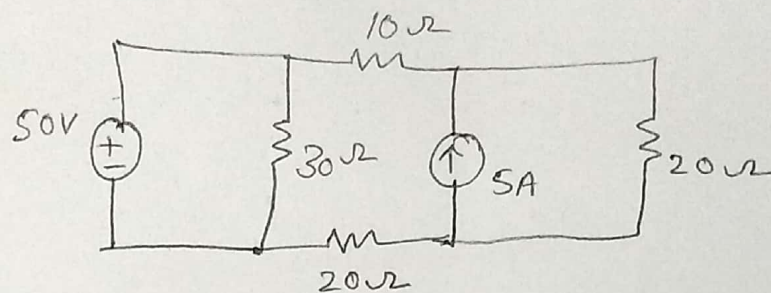

[Ans:  $I_{2\Omega} = 5A$   
 $P_{30V} = 150W$ ]



Find the current in the  $10\text{-}\Omega$  resistor.  
(mesh & node)



Find the current in the  $10\text{-}\Omega$  resistor.  
(mesh & node)



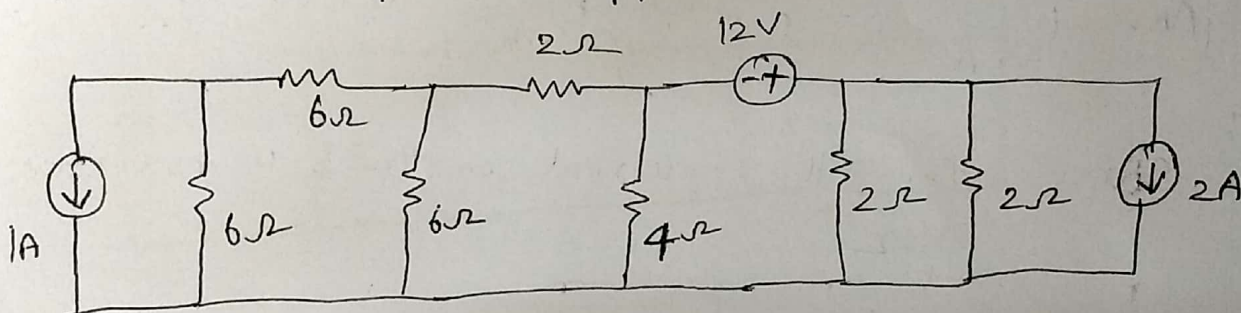
6

Calculate the current through 50-V voltage source & voltage across the 5-A current source & verify  $P_{\text{supplied}} = P_d$

$$\text{[Ans: } I_{10\Omega} = -1A; I_{50V} = \frac{2}{3}A; V_{SA} = 80V]$$

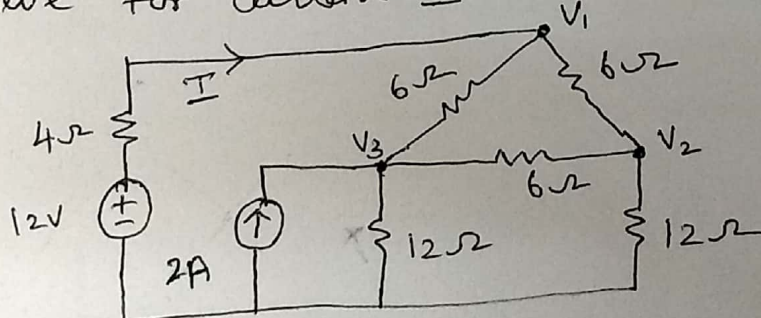
$$P_s = 433.33 \text{ W}$$

(12) Solve for the power supplied by the 12-V source. (mesh)



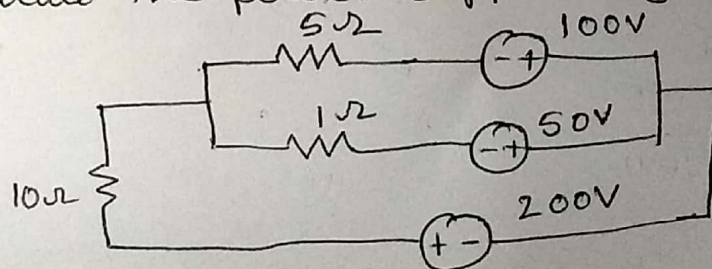
[Ans:  $P_{12V} = 46.56W$ ]

⑬ Solve for current  $I$  for the circuit given below. (mesh & node)



{ Ans:  $I = 0A$  }

(14) Calculate the power supplied by each voltage source. (mesh)



$$[ \text{Ans: } \sum P_{\text{supplied}} = 6576.7 \text{ W} ]$$