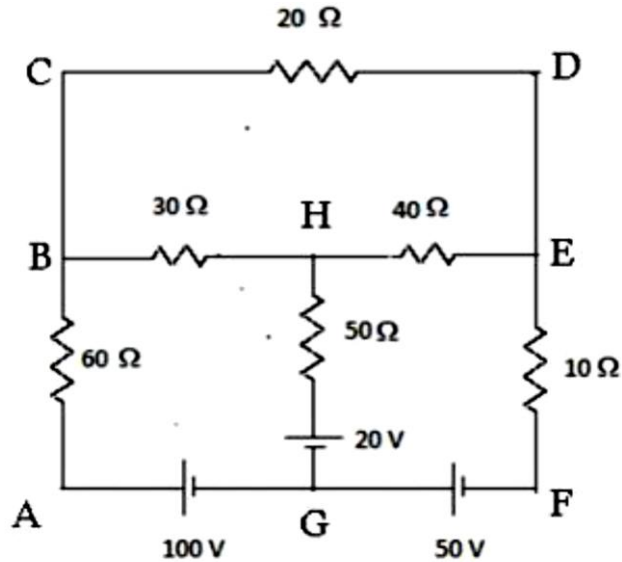


EST130: BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING

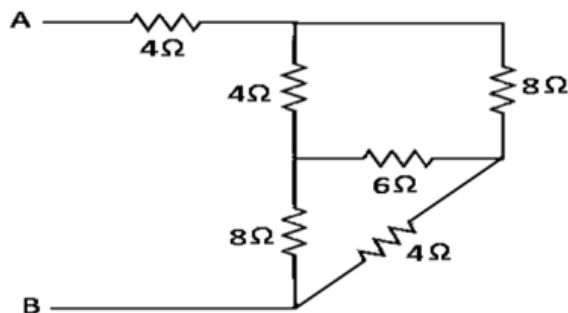
MODULE 1

PRACTICE PROBLEMS

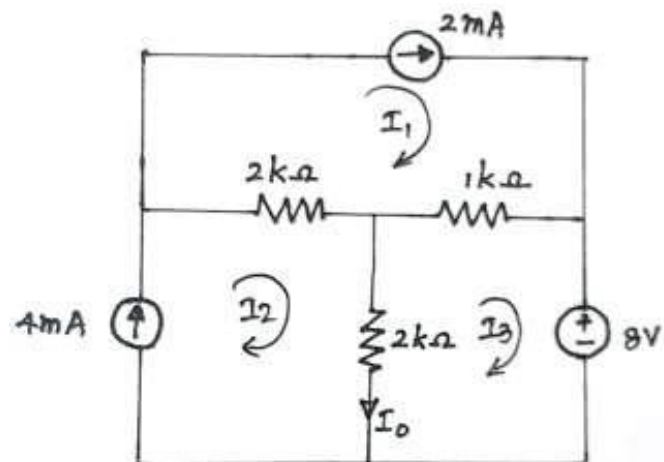
1. Calculate the current in each branch of the following circuit using mesh analysis?



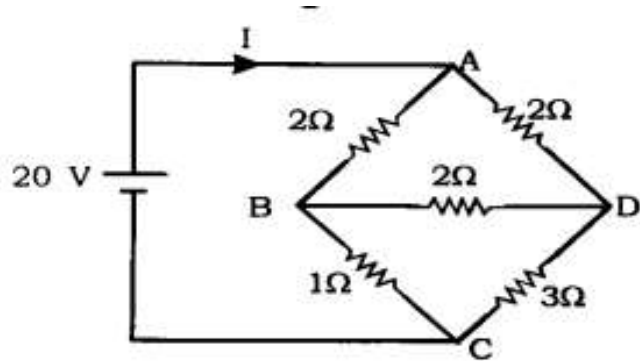
2. Using star-delta transformation, determine the equivalent resistance R_{AB} .



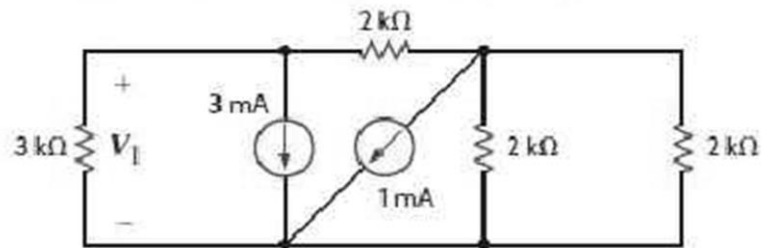
3. Find I_o in the circuit using mesh current analysis.



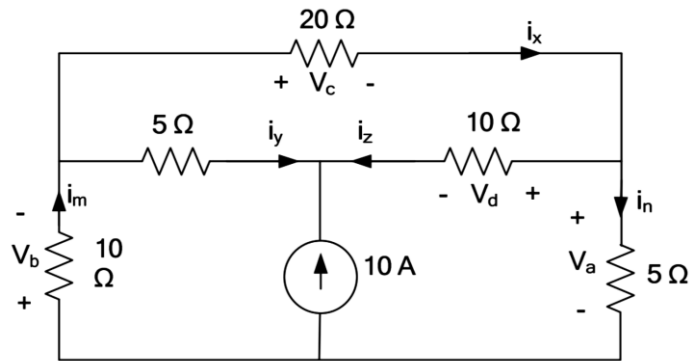
4. Find the source current I in the figure using star-delta transformation.



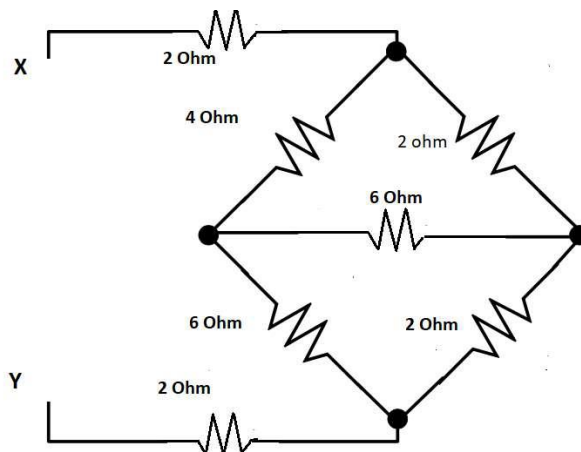
5. Use nodal analysis to find V_1 in the given circuit.



6. Use the nodal analysis to find voltages V_a , V_b , V_c , V_d .



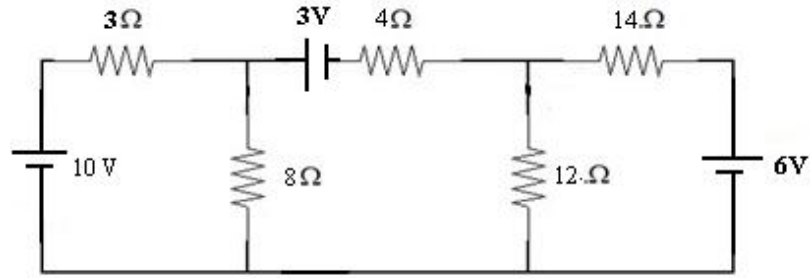
7. Find the equivalent resistance between terminal X-Y in the network.



8. A $50\ \Omega$ resistor is in parallel with a $100\ \Omega$ resistor. Current in $50\ \Omega$ is 7.2A . What is the value of third resistance to be added in parallel to this circuit to make the total current 12.1A .

9. Three resistors of $30\ \Omega$ each are connected in delta. Obtain the equivalent star network.

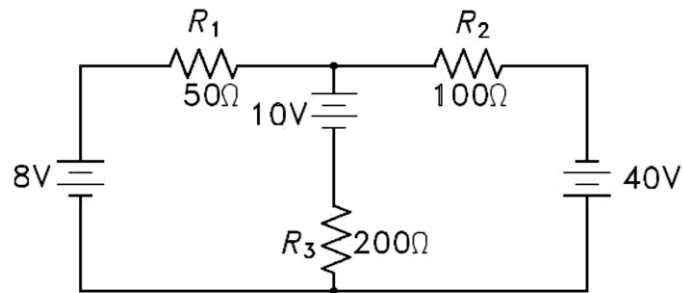
10. For the circuit shown below, find current through 8Ω and 12Ω resistors.



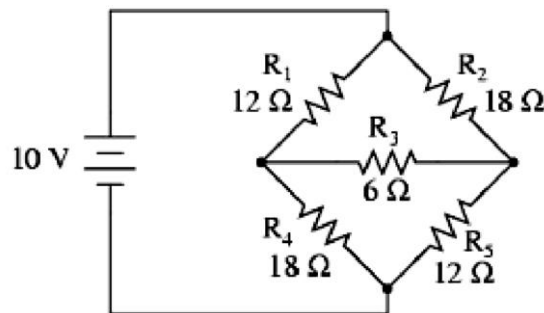
11. Three resistors $R_1 = 30\Omega$, $R_2 = 60\Omega$, and $R_3 = 10\Omega$ are connected in star. Obtain the equivalent delta circuit.

12. A resistor of 5Ω is connected in parallel with a resistor of $R_1\Omega$. This combination is connected in series with an unknown resistor of $R_2\Omega$ and the complete circuit is then connected to 50 V dc supply. Calculate the values of R_1 and R_2 , if the power dissipated by the unknown resistor R_1 is 150 W with 5 A passing through it.

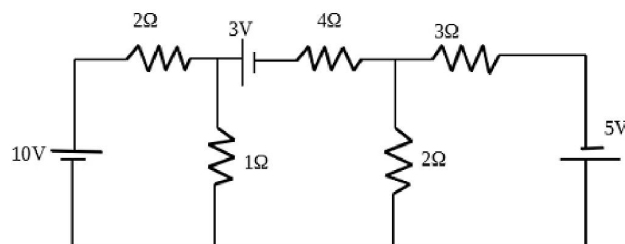
13. Determine the power dissipated in all the three resistors in the following figure using mesh current analysis.



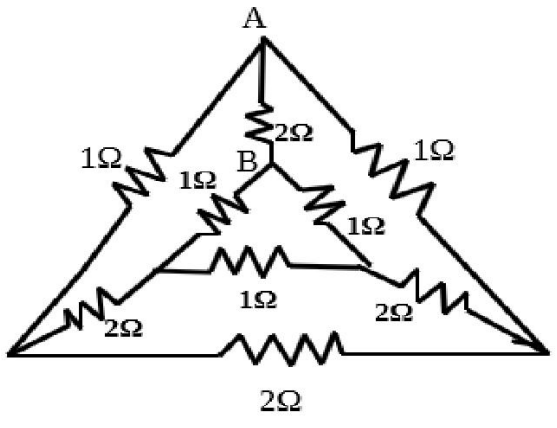
14. Determine the current drawn from the supply using star delta conversion.



15. Calculate power dissipated in 1Ω resistor in the following figure using node voltage method.

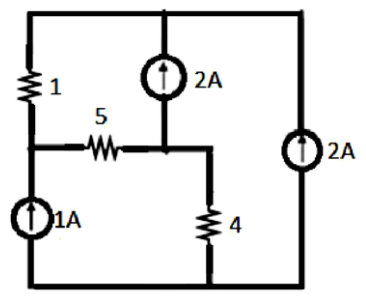


16. Using star delta conversion, calculate the effective resistance between A and B of the following figure.

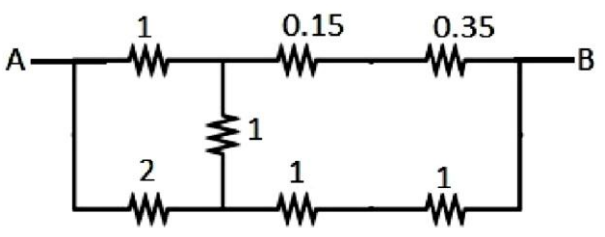


17. Three resistors $R_1=20\ \Omega$, $R_2=90\ \Omega$ and $R_3=10\ \Omega$ are connected in star. Obtain the equivalent delta circuit.

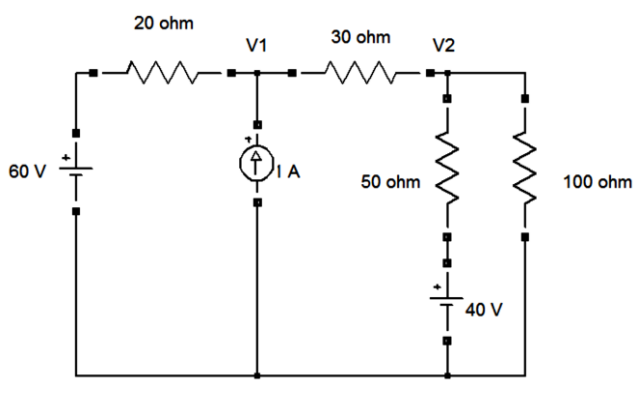
18. Obtain the voltage drops across all resistors of the circuit shown in Fig. using nodal analysis. All the values of the resistances are in Ω .



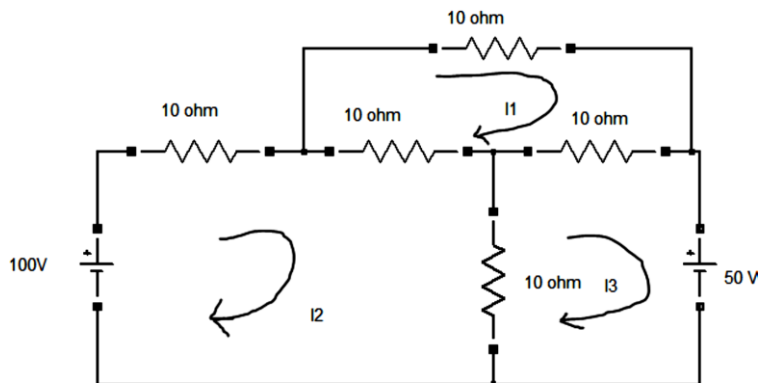
19. Use star-delta/ delta- star transformation to determine the equivalent resistance between the points A and B of the circuit shown in Fig. All the values of the resistances are in Ω .



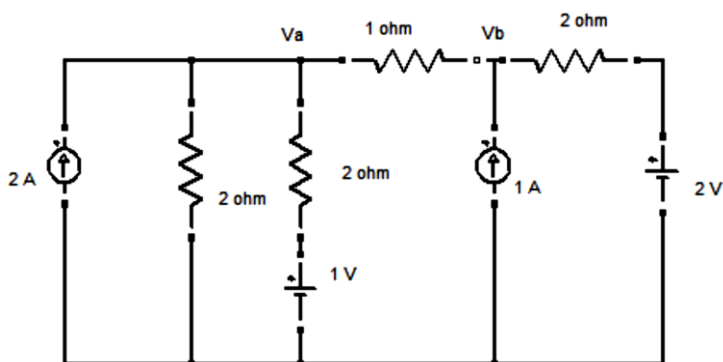
20. Find current in 100 ohm resistor using node analysis.



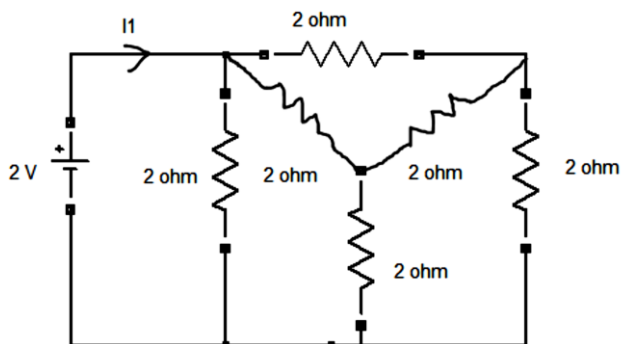
21. Find mesh currents in the figure shown by mesh analysis.



22. Find V_a and V_b using node analysis.

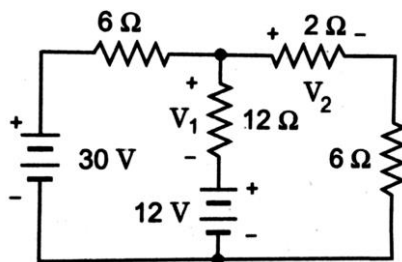


23. Find current I_1 in figure by using Y - Δ transformation.

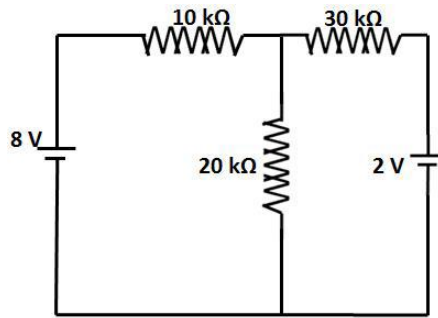


24. Three resistances 1Ω , 2Ω , 3Ω are connected in delta. Determine the resistances for an equivalent star connection.

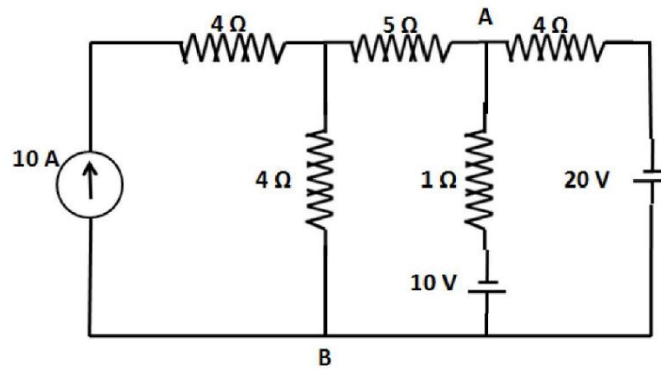
25. Find the voltages V_1 and V_2 across 12Ω and 2Ω resistances in the following circuit using mesh analysis.



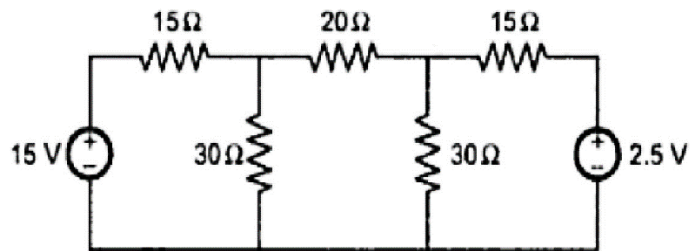
26. Find current through $20\text{k}\Omega$ resistor in the circuit shown below using Kirchhoff's Law.



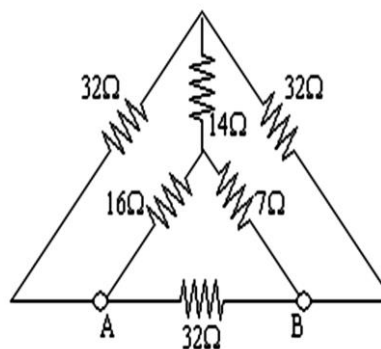
27. Find the voltage between A and B of the circuit shown in Fig. using Mesh analysis.



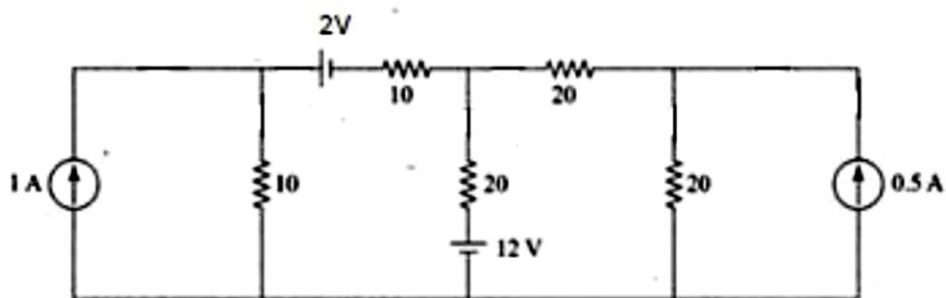
28. Find the current through the 20Ω resistor shown in the Fig by using nodal analysis.



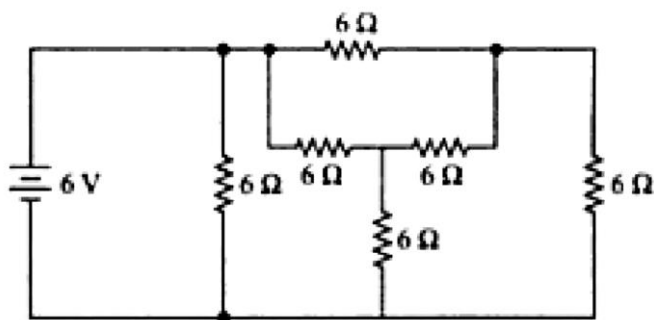
29. In the network shown determine the equivalent resistance between the terminals A and B.



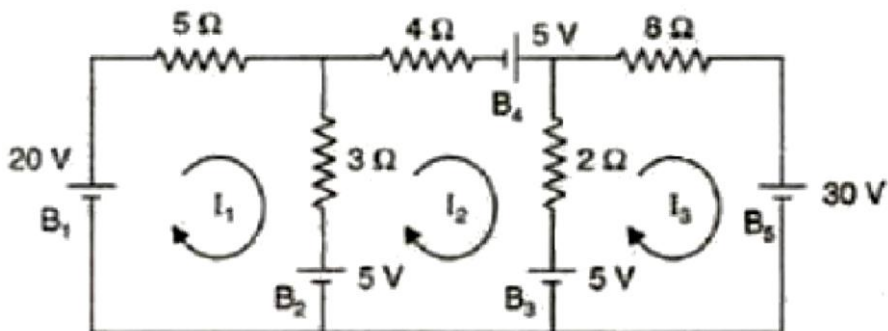
30. Using Nodal Analysis find the currents flowing through the various branches in the circuit shown in figure below.



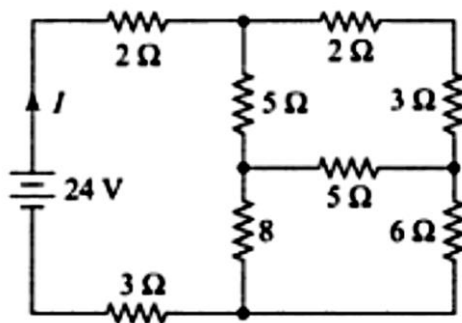
31. Calculate the current supplied by the battery in the circuit shown in figure below.



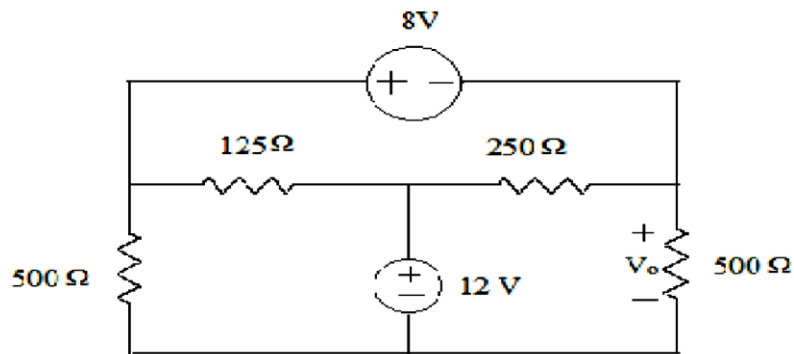
32. Using mesh analysis, determine the current supplied by each battery in the circuit shown in figure.



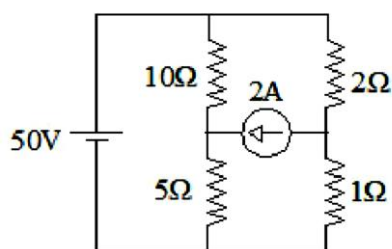
33. Determine the current supplied by the battery in the circuit shown in fig. using star delta transformation.



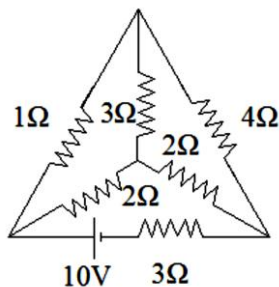
34. Find V_0 for the circuit shown in figure below using nodal analysis.



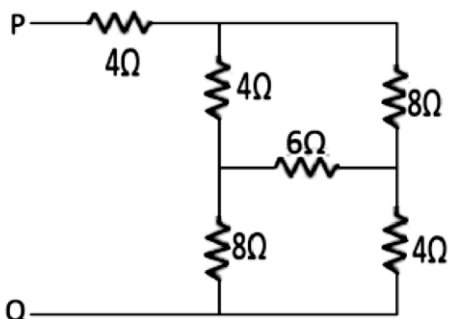
35. Find the values of branch currents in the circuit shown below using mesh analysis.



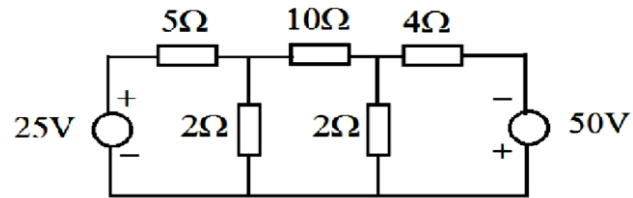
36. Find the branch currents in the circuit shown below using node analysis.



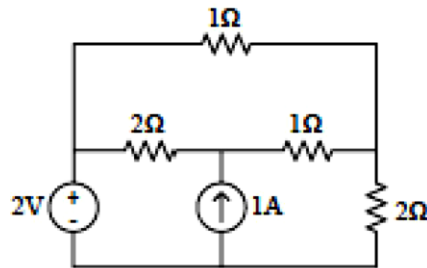
37. Using star delta transformation find the total resistance between points P and Q for the circuit shown below.



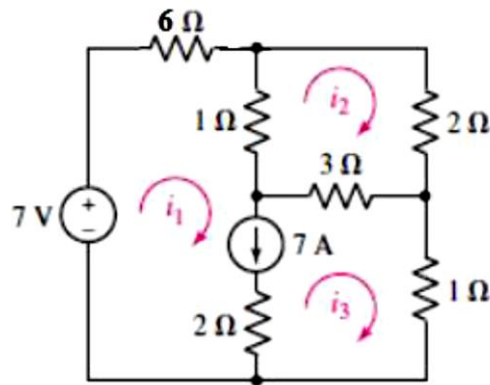
38. For the circuit shown, find voltage across the $10\ \Omega$ resistor using i) Nodal analysis and ii) Mesh analysis.



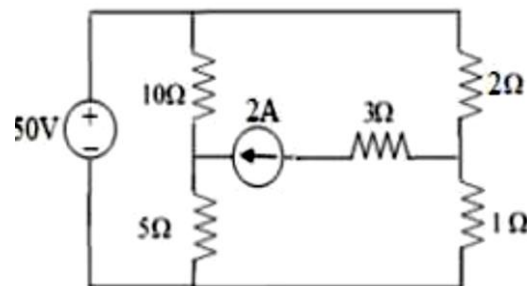
39. Evaluate the power delivered by the 2V source in the circuit below using mesh current method.



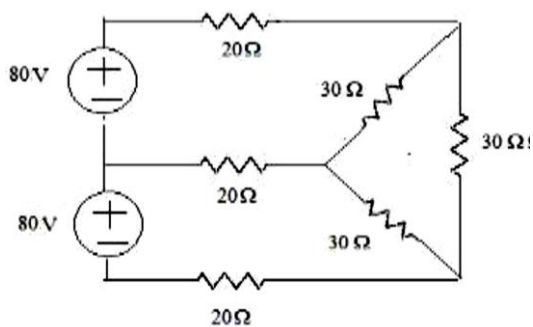
40. Use Mesh analysis to determine currents I_1 , I_2 , I_3 and current through the 3Ω resistor in the circuit below.



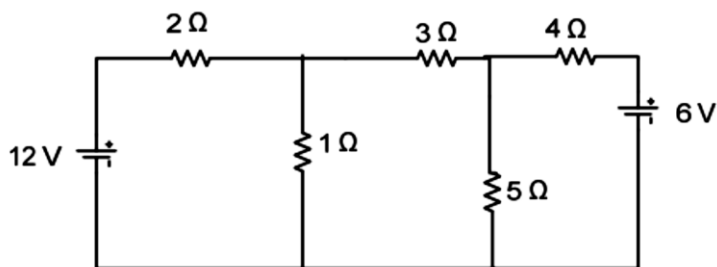
41. Determine the power delivered to the 10Ω and 5Ω resistors in the given circuit.



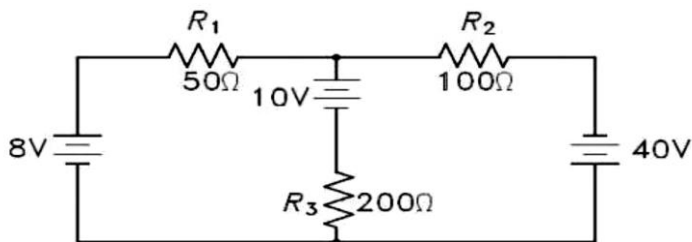
42. Write the mesh equations and find the mesh currents for the circuit shown below. Also find power delivered by the sources.



43. Use nodal analysis to find currents in the different branches of the circuit shown below.



44. Determine the power dissipated in all the three resistors shown in figure using mesh analysis.



45. Determine the values of mesh currents i_1 and i_2 for the circuit shown in figure.

