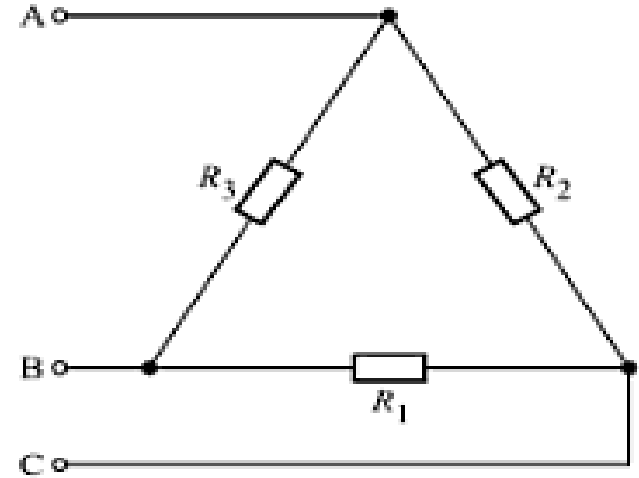
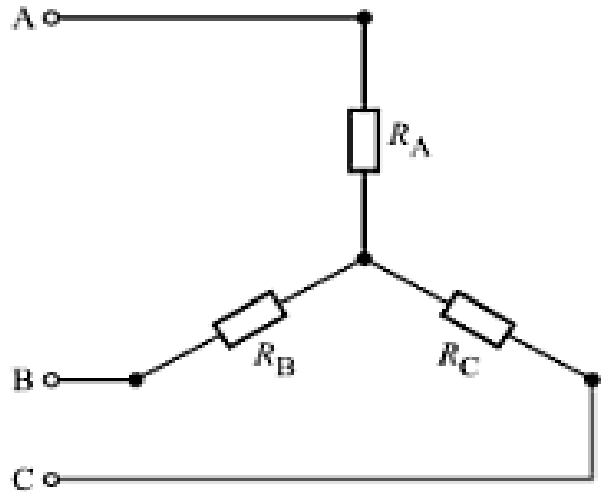


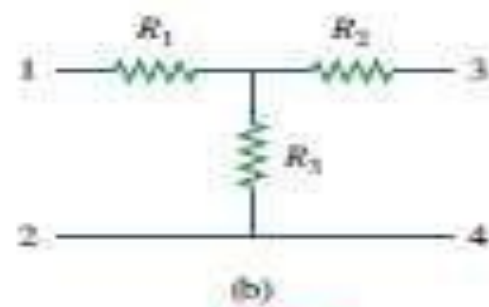
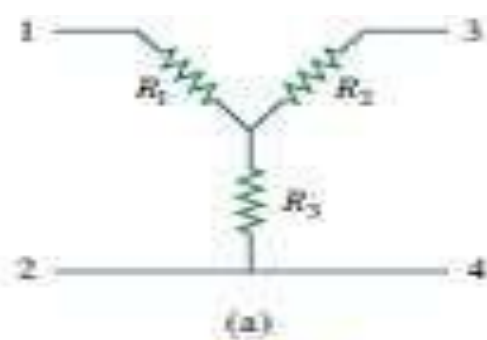
Contents

- ✓ Star to Delta Transformation
- ✓ Nodal Analysis
- ✓ Mesh Analysis

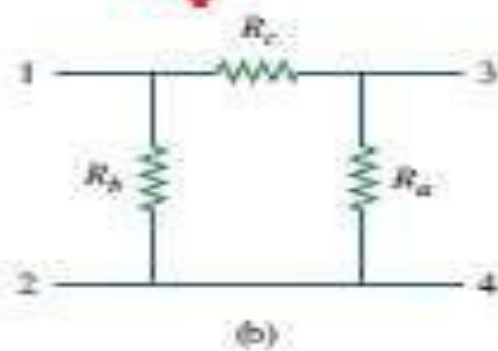
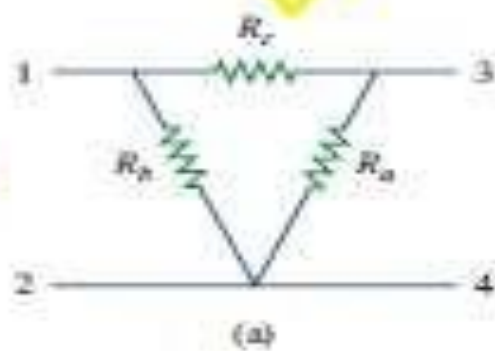
STAR TO DELTA TRANSFORMATION

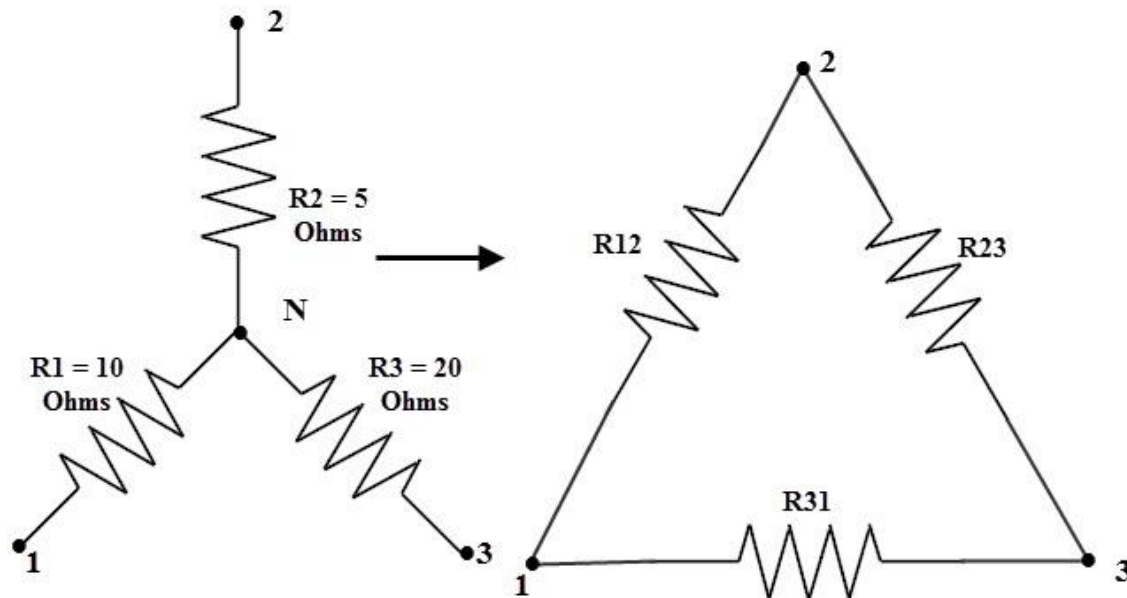


STAR



DELTA

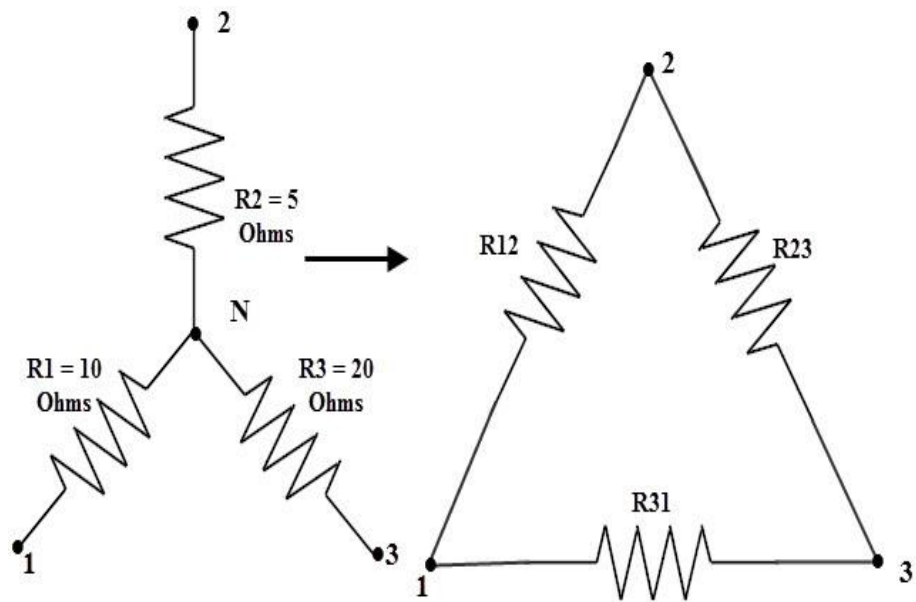




Calculate Equivalent Delta Connection R_{12} , R_{23} , R_{31} for the given Star Connection?

Quiz Poll

- A) 70 ohm, 35 ohm, 17.5 ohm
- B) 35 ohm, 70 ohm, 70 ohm
- C) 17.5 ohm, 35 ohm, 70 ohm
- D) 50 ohm, 17.5 ohm, 70 ohm



Nodal Analysis or Nodal Method

Nodal analysis provides a general procedure for analyzing circuits **using node voltages as the circuit variables.**

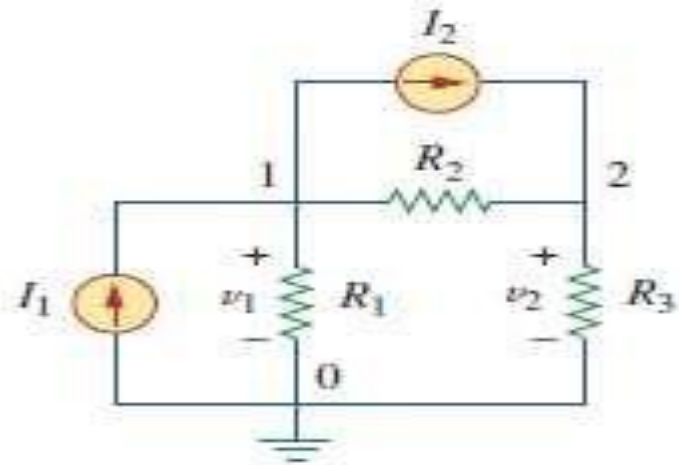
Choosing node voltages instead of element voltages as circuit variables is convenient and **reduces the number of equations one must solve simultaneously.**

Applicable to Nodes only.

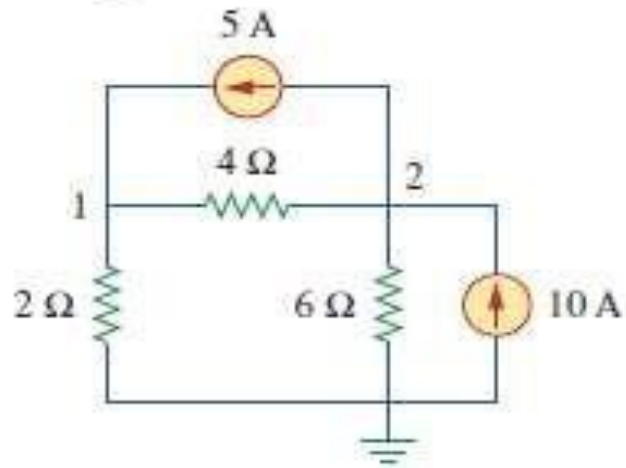
It is used to find the unknown **node voltages.**

This Method is Application of KCL+ Ohm's Law

EXAMPLE OF NODAL ANALYSIS



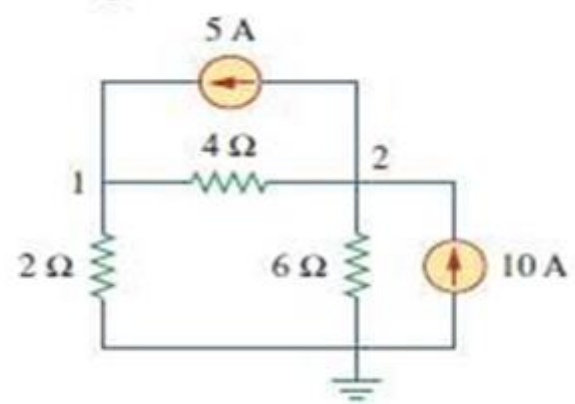
Calculate the node voltages in the circuit shown in Fig



QUIZ POLL

V1 and V2 are

- A) 30V , 50V
- B) 20mV , $13.33\ \text{mV}$
- C) 30mV , 50mV
- D) 20V , $13.33\ \text{V}$



MESH ANALYSIS

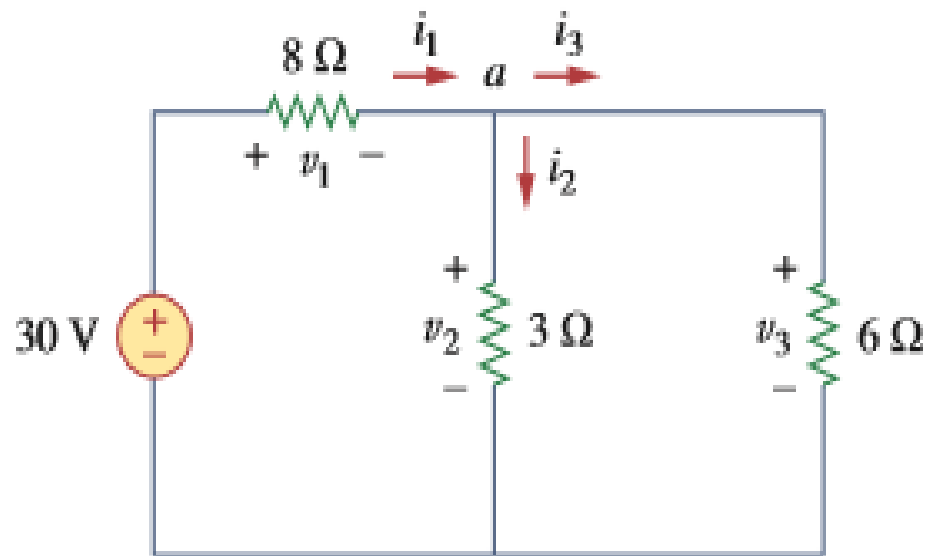
- Mesh analysis provides another general procedure for analyzing circuits, using **mesh currents** as the circuit variables.
-
- Using mesh currents instead of element currents as circuit variables is convenient and reduces the **number of equations** that must be solved simultaneously.
 - MESH: A mesh is a loop that does not contain any other loop within it.

Basic Difference Between Nodal and Mesh Analysis

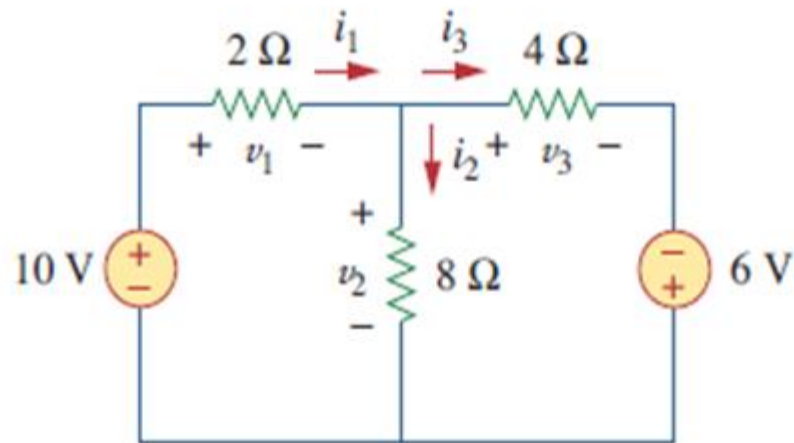
- Nodal analysis **applies KCL** to find unknown **voltage** in a given circuit, while
- Mesh analysis **applies KVL** to find unknown **currents**.

PRACTICE PROBLEM:-

Find Currents and Voltages in the circuit?



Find the currents and voltages in the circuit shown in Fig.



QUIZ POLL

What is the Value of V_1 , V_2 and V_3 ?

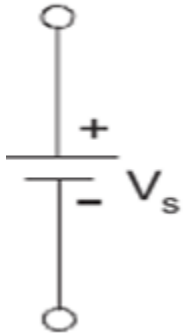
- A) 10V, 6V, 20 V
- B) 6V, 4V, 10V
- C) -10 V, -6 V, -20 V
- D) 6mV, 4mV, 10 mV

INDEPENDENT AND DEPENDENT SOURCES

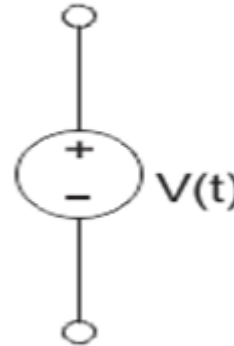
- The electrical source is of two types namely **independent source and dependent source**.
- The **Independent and Dependent** source means, whether the voltage or current sources are either **depending upon some other source**, or they are acting **independently**.

INDEPENDENT SOURCES

a) Independent Voltage Source



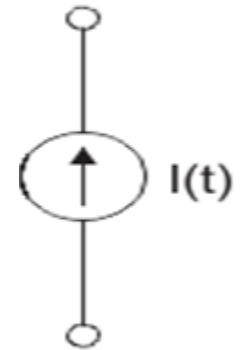
c) Independent Time Invariant Voltage Source



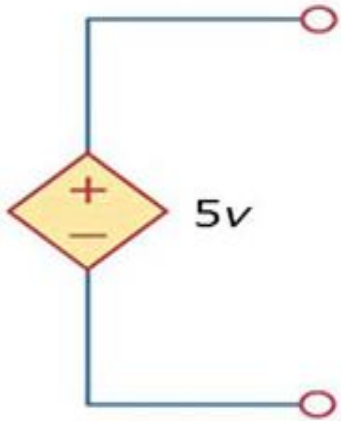
b) Independent Current Source



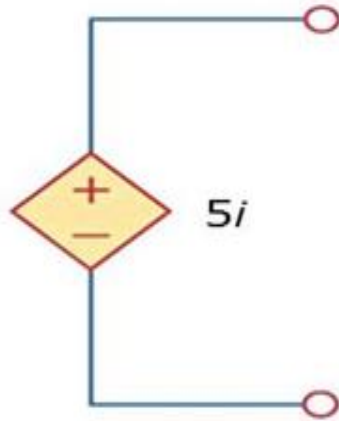
d) Independent Time Invariant Current Source



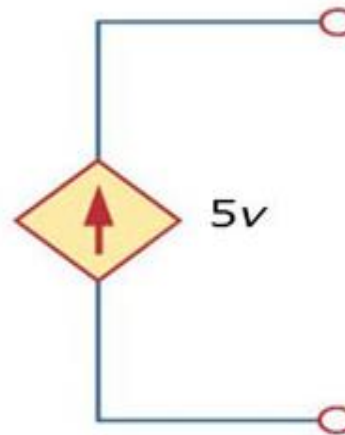
DEPENDENT SOURCES



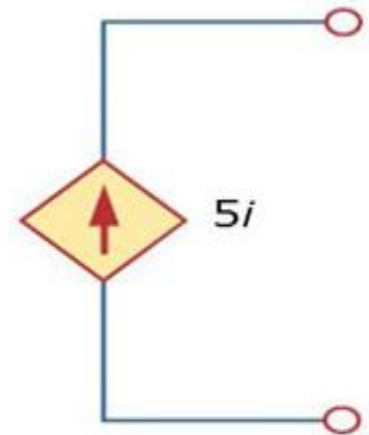
Voltage-
controlled
voltage
source



Current-
controlled
voltage
source



Voltage-
controlled
current
source



Current-
controlled
current
source

EXAMPLES OF DEPENDENT SOURCES IN ELECTRICAL CIRCUITS:-

