SNS COLLEGE OF TECHNOLOGY

(AN AUTONOMOUS INSTITUTION)

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Department of Biomedical Engineering

Course Name: 23BMT201 & Circuit Analysis

I Year : II Semester

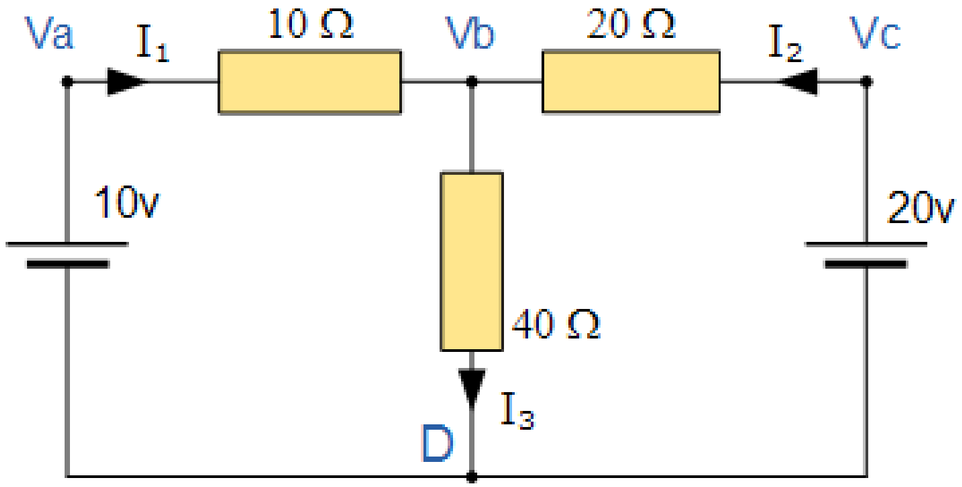
Unit I –DC AND AC CIRCUITS ANALYSIS

Topic : Nodal Analysis

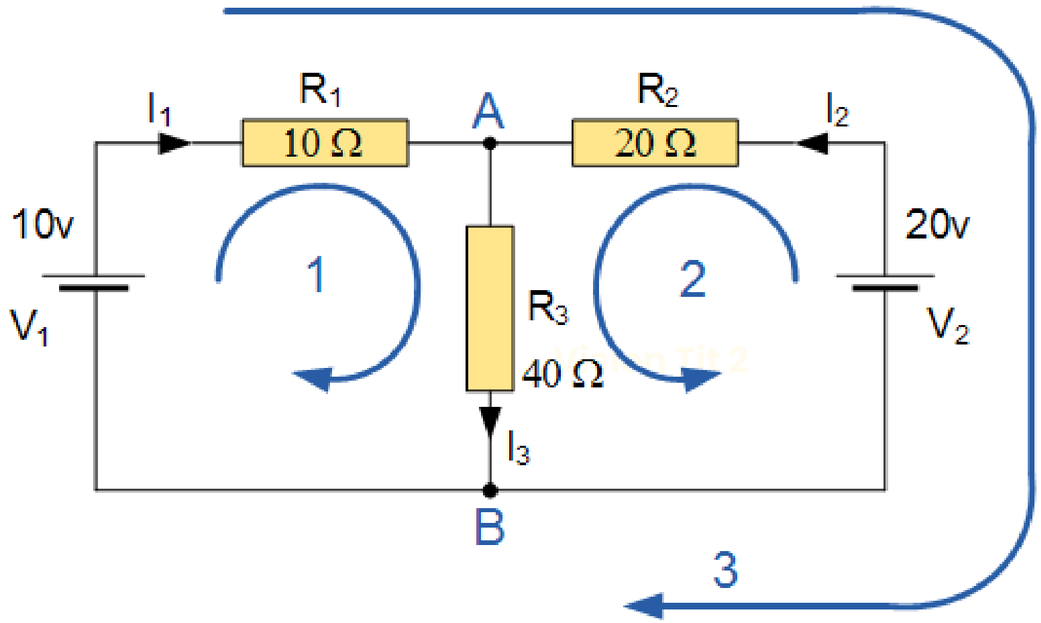
Nodal Voltage Analysis

•Nodal Voltage Analysis finds the unknown voltage drops around a circuit between different nodes that provide a common connection for two or more circuit components.

•Nodal Voltage Analysis complements the previous mesh analysis in that it is equally powerful and based on the same concepts of matrix analysis. As its name implies, Nodal Voltage Analysis uses the “Nodal” equations of Kirchhoff’s first law to find the voltage potentials around the circuit.



A Typical DC Circuit



Using **Kirchhoff's Current Law**, **KCL** the equations are given as:

At node A : $I_1 + I_2 = I_3$

At node B : $I_3 = I_1 + I_2$

Nodal Voltage Analysis

•In the above circuit, node D is chosen as the reference node and the other three nodes are assumed to have voltages, Va, Vb and Vc with respect to node D.

$$\frac{(V_a - V_b)}{10} + \frac{(V_c - V_b)}{20} = \frac{V_b}{40}$$

• Solving above equation we can find the nodal voltages and corresponding current.