

EXPERIMENT-1

KIRCHHOFF'S CURRENT LAW (KCL)

PROBLEM STATEMENT: To study Kirchhoff's Current Law

THEORY:

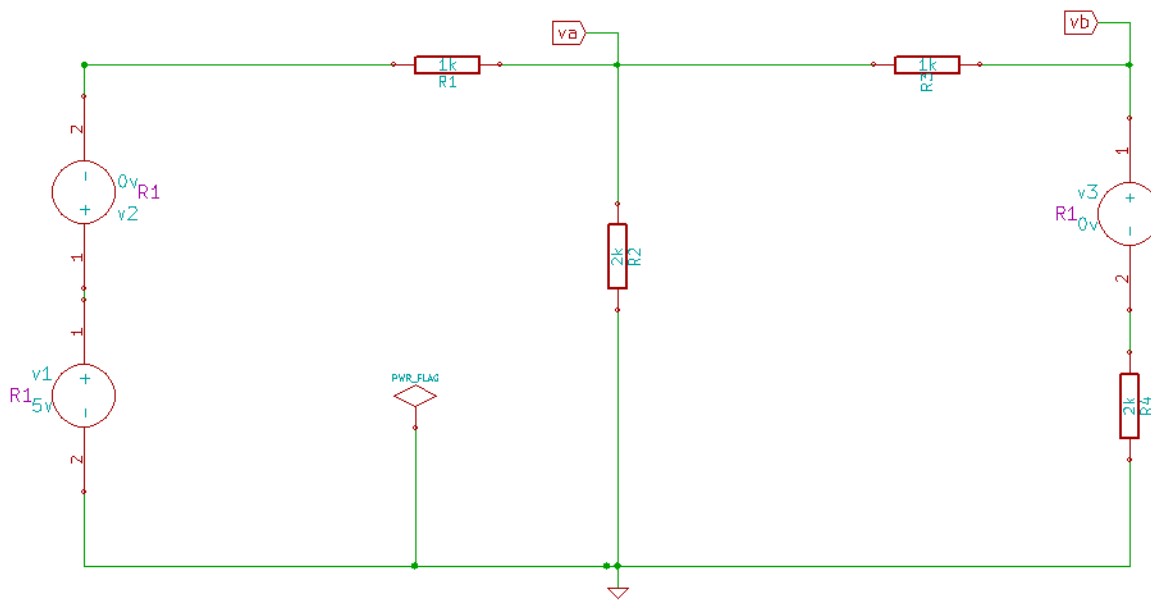
This experiment is focused on observing voltages at various places in the network and to compare the observed value with the values calculated using the Kirchhoff's current law.

Kirchhoff's Current law states that the sum of current entering to the node is equal to the sum of current leaving at the node.

Kirchhoff's current law (KCL) is based on the conservation of charge and is derived from Maxwell's equations. This along with Ohm's law is the most basic law for solving any electric circuit.

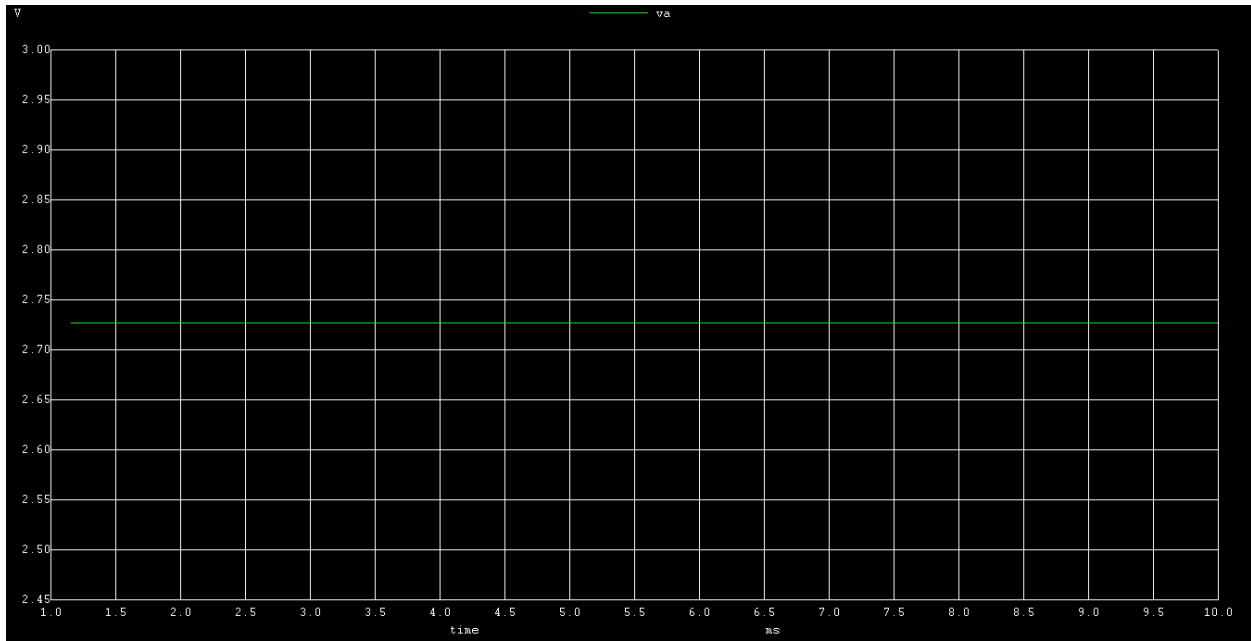
These kinds of law allow us to analyze the entire system in parts. This also enable us to find basic quantities of any electric circuit i.e., node voltages in any section or at any point in the given circuit.

SCHEMATIC DIAGRAM:

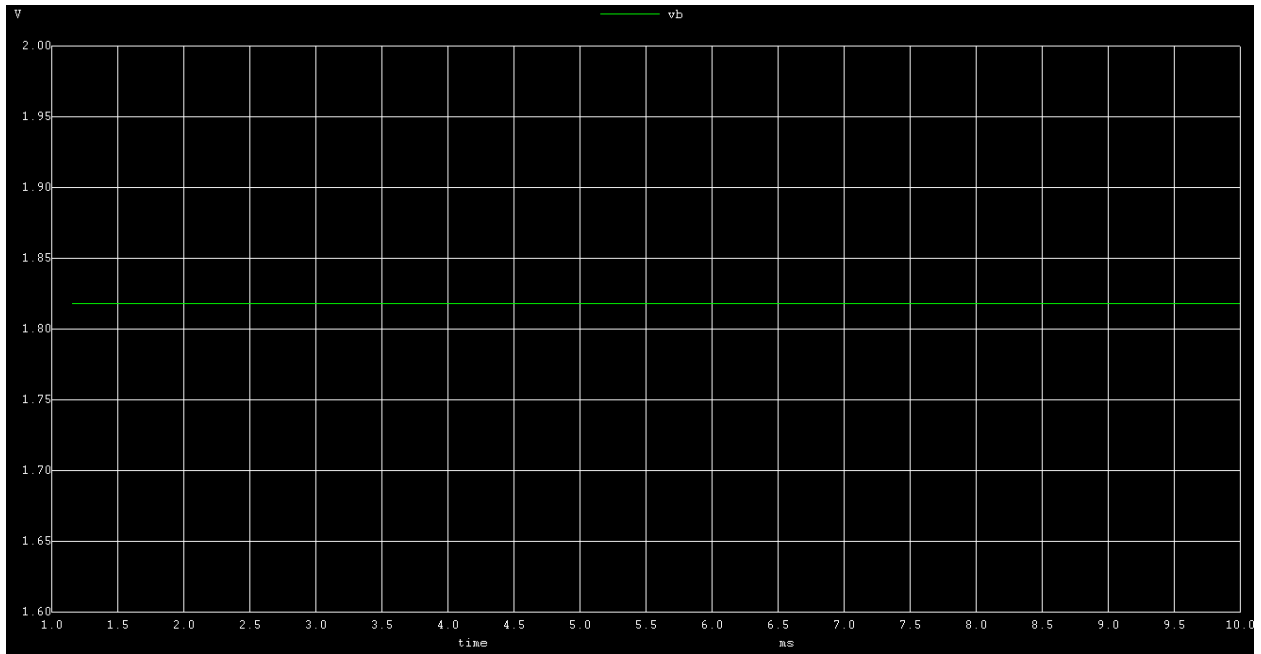


SIMULATION OUTPUT:

Voltage at node-1 (V_a)



Voltage at node-2 (V_b)



CALCULATIONS:

Applying KCL at node v_a ,

$$(V_1 - V_a)/R_1 = (V_a - 0)/R_2 + (V_a - V_b)/R_3$$

Applying KCL at node v_b ,

$$(V_b - V_a)/R_3 + (V_b)/R_1 = 0$$

CONCLUSION: