

**ECA Lab 07: Validation of node voltage method**



REGISTRATION NO : FA21-BSE-083

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CLASS: BSE 1B

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#### **Measurement Tables:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Nodes** | **Calculated Voltage (V)** | **Measured Voltage (V)** | **Simulated Voltage (V)** |
| **A** | **10** | **10.00** | **10.00** |
| **B** | **6.438** | **6.44** | **6.438** |
| **C** | **5.00** | **5.09** | **5** |

**Table 7.1 (a)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Resistance values** | **Calculation results** | | **Measurement results** | | **Simulation result** | |
| **Voltage (V)** | **Current (A)** | **Voltage (V)** | **Current (A)** | **Voltage (V)** | **Current (A)** |
| **R1 =3.3K** | **3.562** | **1.079mA** | **3.590** | **1.083mA** | **3.562** | **1.079mA** |
| **R2 = 10K** | **6.438** | **0.643mA** | **6.450** | **0.646mA** | **6.438** | **0.643mA** |
| **R3 = 3.3K** | **1.438** | **0.436mA** | **1.455** | **0.435mA** | **1.438** | **0.436mA** |
| **R4 = 100K** | **5.00** | **0.05mA** | **5.05** | **0.500mA** | **5.000** | **0.05mA** |

**Table 7.1 (b)**

**Questions?**

1. What is the difference between Nodal Analysis and Mesh Analysis methods?

ANSWER:

* Nodal analysis is used to determine node voltages by solving KCL equations for the incoming and outgoing currents at each node. While Mesh analysis is used to determine currents in a circuit loop by solving KVL equations for the voltages across each component in the loop.

1. What is the difference between node and essential node?

ANSWER:

* A node is the complete interconnection between circuit elements. While an essential node is a node where three or more elements meet.

1. What is the criterion for selecting reference node out of various essential nodes?

ANSWER:

* In circuits, we usually label a node as the reference node also called ground and define the other node voltages with respect to this point. The reference node has a potential of 0V by definition.

**Critical Analysis / Conclusion:**

In this lab I have learnt that how to identify nodes and reference nodes. After this lab work I am also able to find nodes voltages physically using DMM, DC voltage source connecting wires and resistors. With this also got more knowledge about using of LT Spice.