Marmara University
Faculty of Engineering

ELECTRICAL & ELECTRONICS ENGINEERING DEPARTMENT

EE 232

ELECTRONICS LABORATORY

EXPERIMENT-1

COURSE LECTURER:

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LABORATORY INSTRUCTOR:

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Objectives: In this experiment, important tools of circuit analysis, node and mesh analysis and superposition techniques, are aimed to be covered in purpose of obtaining convenience for oncoming experiments. Besides, any troubles in measuring amps & volts or usage of fundamental equipment, i.e. DMM, DC power supply, also specified as goals of the experiment.

Materials:

Breadboard
DMM (Digital multi-meter)
DC Power Supply
Resistor(s)

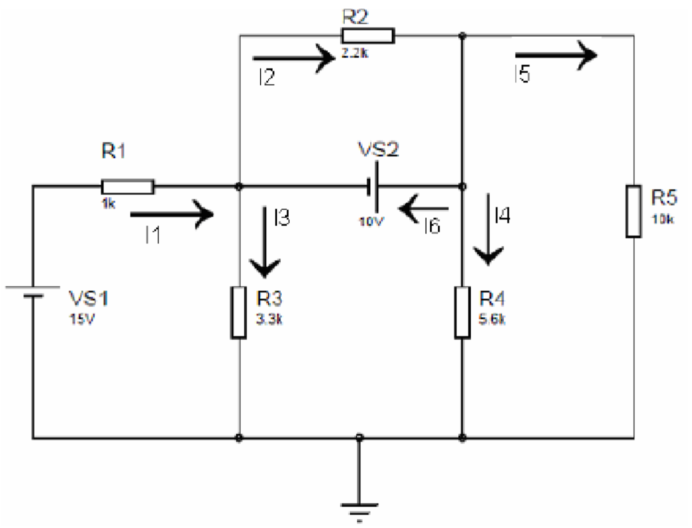
For reading color-codes, use table below;

Table 0-1 Resistor Color Coding

Color	*1st Digit*	*2nd Digit*	*Multiplier*	*Tolerance*
Black	0	0	1	+20%
Brown	1	1	10	+1%
Red	2	2	100	+2%
Orange	3	3	1,000	+3%
Yellow	4	4	10,000	+4%
Green	5	5	100,000	n/a
Blue	6	6	1,000,000	n/a
Violet	7	7	10,000,000	n/a
Gray	8	8	100,000,000	n/a
White	9	9	n/a	n/a
Gold			0.1	+5%
Silver			0.01	+10%

NODE ANALYSIS

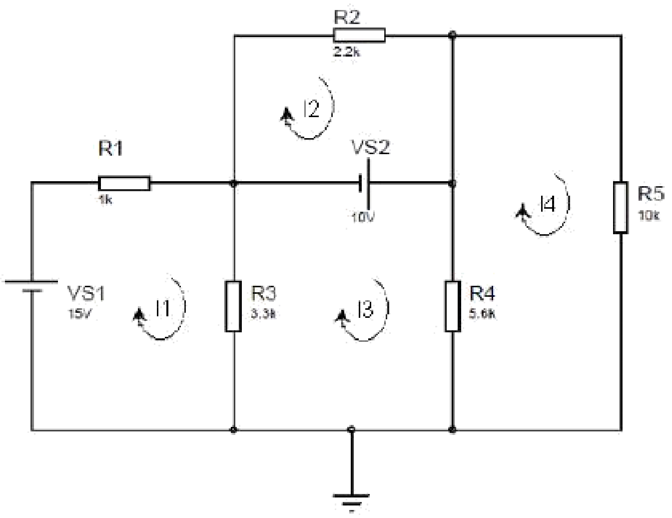
- Label all nodes in the circuit. Arbitrarily select any node as reference.
- Define a voltage variable from every remaining node to the reference. These voltage variables must be defined as voltage rises with respect to the reference node.
- Write a KCL equation for every node except the reference.
- Solve the resulting system of equations.



MESH ANALYSIS

Mesh — a loop that does not contain an inner loop.

- Count the number of "window panes" in the circuit. Assign a mesh current to each window pane.
- Write a KVL equation for every mesh whose current is unknown.
- Solve the resulting equations



Procedure:

1. Calculate and measure resistance:

R_1 (Calculated (color-codes)) = ………………………………………………

R_2 (Calculated (color-codes)) = ………………………………………………

R_3 (Calculated (color-codes)) = ………………………………………………

R_4 (Calculated (color-codes)) = ………………………………………………

R_5 (Calculated (color-codes)) = ………………………………………………

R_1 (Measured) = ……………………………………………………………

R_2 (Measured) = ……………………………………………………………

R_3 (Measured) = ……………………………………………………………

R_4 (Measured) = ……………………………………………………………

R_5 (Measured) = ……………………………………………………………

2. Measure voltage:

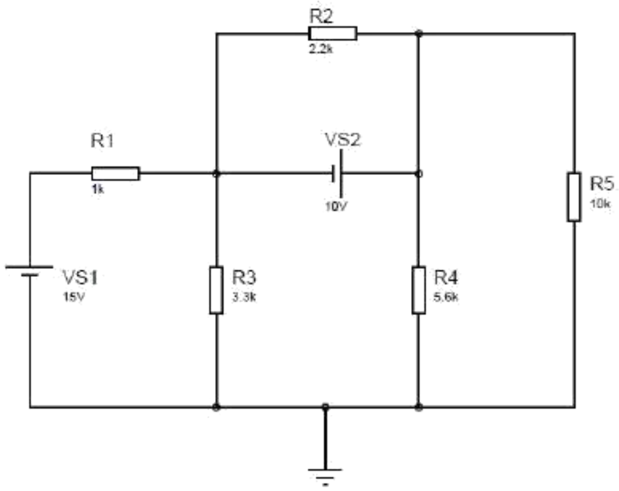
Adjust V_{s1}= 15 V

V_{s2}= 10 V

V_{s1} (measured) = ...

V_{s2} (measured) = ...

3. Build the following circuit (Watch out - second source will float):



4. Measure currents:

I_1= ....

I_2= ....

I_3= ....

I_4= ....

I_5= ....

5. Compare measured values with calculated values

6. Measure voltages:

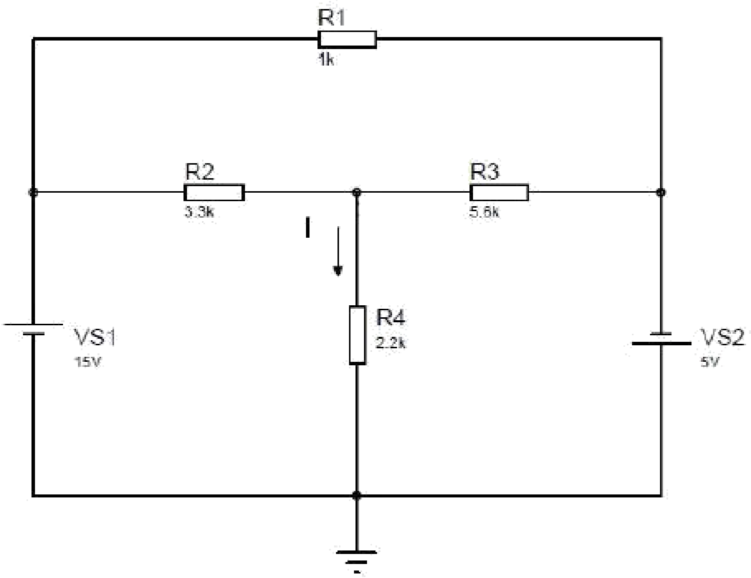
V_A= ....

V_B= ....

7. Compare measured values with calculated values

8. Solve following circuit with superposition technique.

9. Build the circuit



10. Measure current I

I = ……………………………………………

11. Replace the other independent voltage sources with a *short circuit* (*i.e.*, *v* = 0) one by one, then measure I_{11} and I_{12}.

I_{11} = ……………………………………………

I_{12} = ……………………………………………

12. Calculate $I = I_{11} + I_{12}$ and comment on measured and calculated value results.