



## **Department of Computer Science and Engineering**

**Course Title:** Electrical Circuits

**Course Number:** 209

**Semester:** 4<sup>th</sup>

**Experiment No.:** 03

**Experiment Title:** Bias Point Detail Analysis of DC Circuit with Independent Sources Using PSpice Schematics.

**Student ID:** 2020-3-60-012

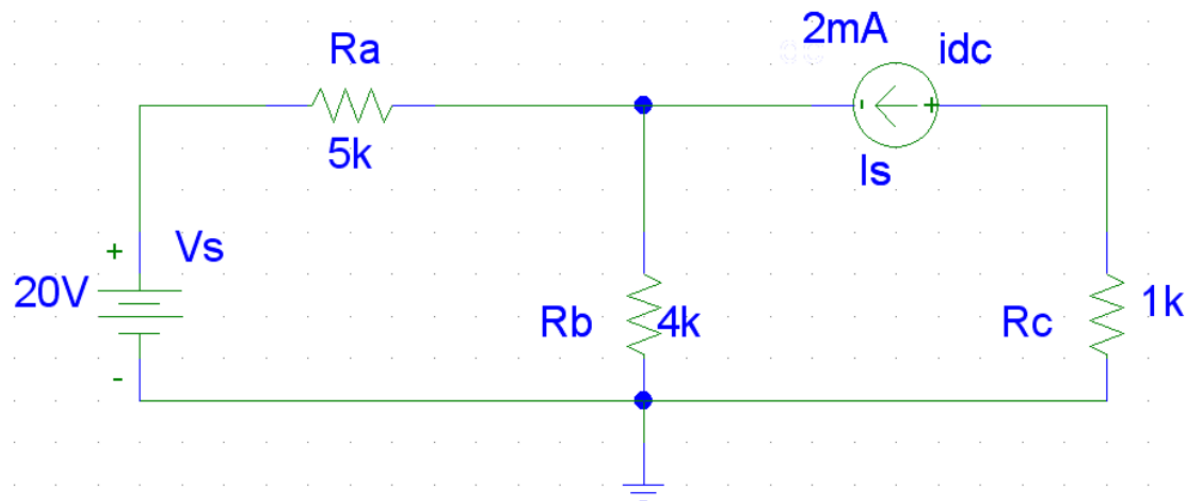
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**Date of Performance:** 23-11-21

**Date of Report Submission:** 07-01-2022

**Objectives:**

1. To learn fundamentals of PSpice.
2. To analyze Bias Point Detail of DC Circuit using PSpice Schematics.

**Circuit Diagram :01****Figure 01: Example circuit****Answer to the question of post lab report 01:**

Applying KCL at node 1,

$$\frac{20 - V_1}{5k} + 2m = \frac{V_1}{4K} \quad \dots\dots\dots (1)$$

Applying KCL at node 2,

$$2m = -\frac{V_2}{1K} \quad \dots\dots\dots (2)$$

Solving equation (1) & (2)

$$V1 = 13.333 \text{ V}$$

$$V2 = -2 \text{ V}$$

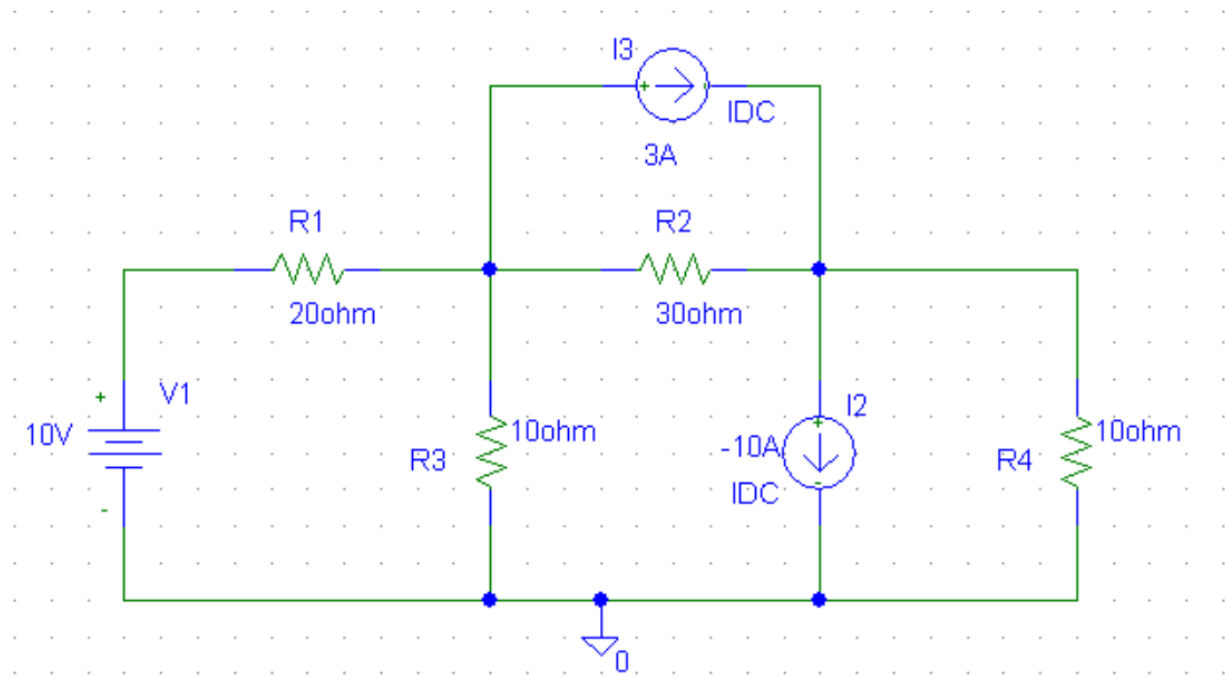
From  $V1$  &  $V2$ , we will find  $I1$  &  $I2$ ,

$$I1 = \frac{20 - V1}{5K} = 0.001333 \text{ A} = 1.333 \text{ mA}$$

$$I2 = \frac{V1}{4K} = 0.00333 \text{ A} = 3.333 \text{ mA}$$

**Answer to the question of post lab report 02:**

The theoretical solution of the circuit and solution obtained from PSpice is the same.

**Circuit Diagram :02****Figure 02: Circuit for lab practice****Answer to the question of post lab report 01:**

Applying KCL at node 2,

$$\frac{10-V_2}{20} = 3 + \frac{V_2-V_3}{30} + \frac{V_2}{10} \dots\dots\dots (1)$$

Applying KCL at node 3,

$$3 + \frac{V_2-V_3}{30} = -10 + V_3/10 \dots\dots\dots (2)$$

Solving equation (1) & (2)

$$V1 = 10 \text{ V}$$

$$V2 = 4.286 \text{ V}$$

$$V3 = 98.571 \text{ V}$$

From  $V1$ ,  $V2$  &  $V3$ , we will find  $I1$ ,  $I2$  &  $I3$ ,

$$I1 = \frac{10 - V2}{20} = 0.2857 \text{ A}$$

$$I2 = \frac{V2 - V3}{30} = -3.143 \text{ A}$$

$$I3 = \frac{V3}{10} = 9.857 \text{ A}$$

**Answer to the question of post lab report 02:**

The theoretical solution of the circuit and solution obtained from PSpice is the same.

**Conclusion:**

We have theoretically calculated all the currents and voltages and found no discrepancy in PSpice.

