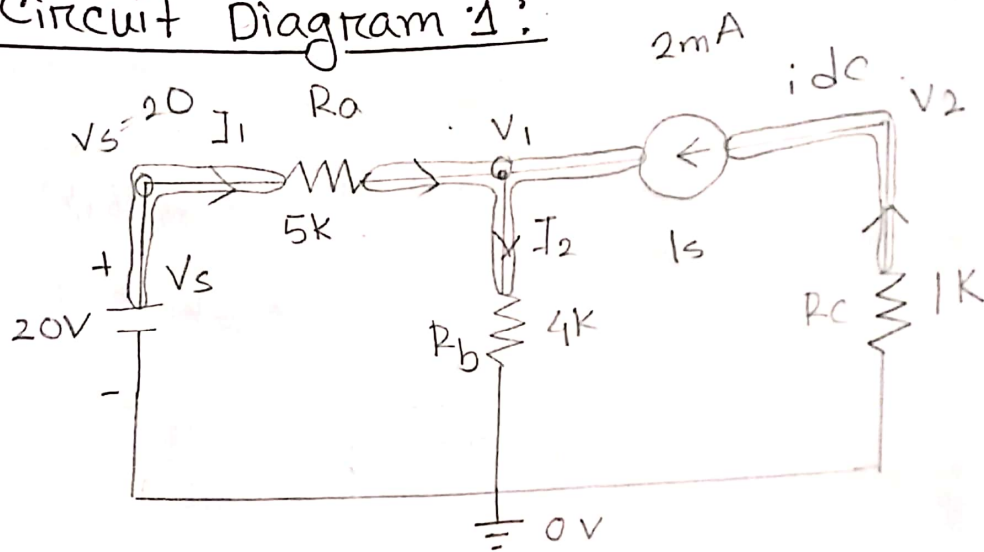


Experiment: 3:

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

Circuit Diagram 1:



Applying KCL at node 1,

$$\frac{20 - V_1}{5k} + 2m = \frac{V_1}{4k} \quad \text{--- (i)}$$

Applying KCL at node 2,

$$2m = \frac{-V_2}{1k} \quad \text{--- (ii)}$$

Solving eq (i), (ii)

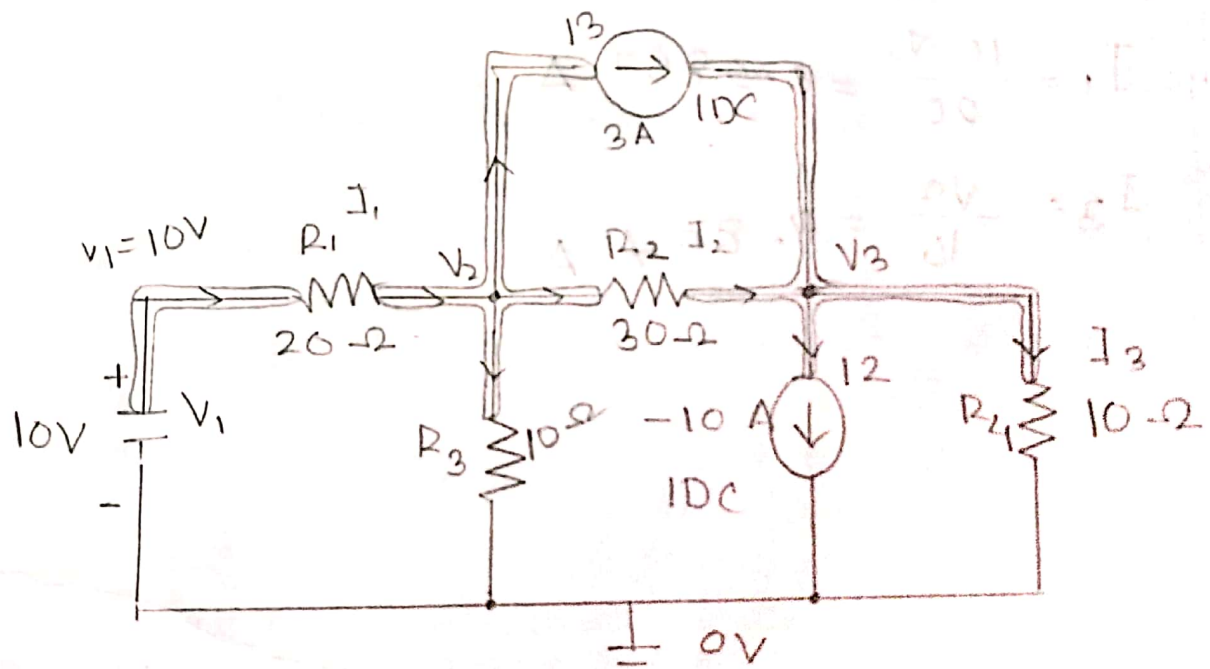
$$V_1 = 13.333 \text{ V}$$

$$V_2 = -2 \text{ V}$$

$$I_1 = \frac{20 - V_1}{5k} = 0.0013334 \text{ A} = 1.333 \text{ mA}$$

$$I_2 = \frac{V_1 - 0}{4k} = 0.00333 \text{ A} = 3.333 \text{ mA}$$

Circuit Diagram : 2



Applying KCL at node 2,

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

Applying KCL at node 3,

$$3 + \frac{V_2 - V_3}{30} = -10 + \frac{V_3}{10} \quad \text{--- (11)}$$

Solving eqn, (11) -

$$V_2 = 4.285 \text{ V}$$

$$V_3 = 98.571 \text{ V}$$

$$V_1 = 10 \text{ V}$$

$$I_2 = \frac{V_2 - V_3}{30} = -3.143 \text{ A}$$

$$I_1 = \frac{10 - V_2}{20} = 0.2857 \text{ A}$$

$$I_3 = \frac{V_3}{10} = 9.857 \text{ A}$$