Umar Khan / Alex Wall

Professor Joshua Hayter

CECS 211

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<div align="center">Lab 5</div>

**Mesh Analysis**



Circuit diagram:

$R_1$ 3.9K, $R_2$ 6.8K, $R_3$ 5.1k, 12V, 5V, $I_1$, $I_2$
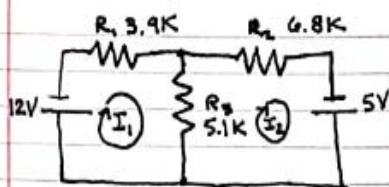
Alex Wall
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**Mesh 1**

$$3.9K\,I_1 + 5.1k\,I_1 - 5.1k\,I_2 - 12 = 0$$
$$9k\,I_1 - 5.1k\,I_2 = 12$$

$$\frac{9}{5.1} = 1.7647$$

**Mesh 2**

$$6.8k\,I_2 + 5.1k\,I_2 - 5.1k\,I_1 + 5 = 0$$
$$-5.1k\,I_1 + 11.9k\,I_2 = -5$$
$$1.7647(-5.1k\,I_1 + 11.9k\,I_2 = -5)$$
$$-9k\,I_1 + 21k\,I_2 = -8.8235$$

$$-9k\,I_1 + 21k\,I_2 = -8.8235$$
$$+\ 9k\,I_1 - 5.1k\,I_2 = 12$$
$$\overline{\qquad\qquad 15.9k\,I_2 = 3.1765}$$
$$\frac{15.9k}{} \qquad \frac{15.9k}{}$$
$$I_2 = 0.0001997 = 200\,uA$$

$$9k\,I_1 - 5.1k\,(200mA) = 12$$
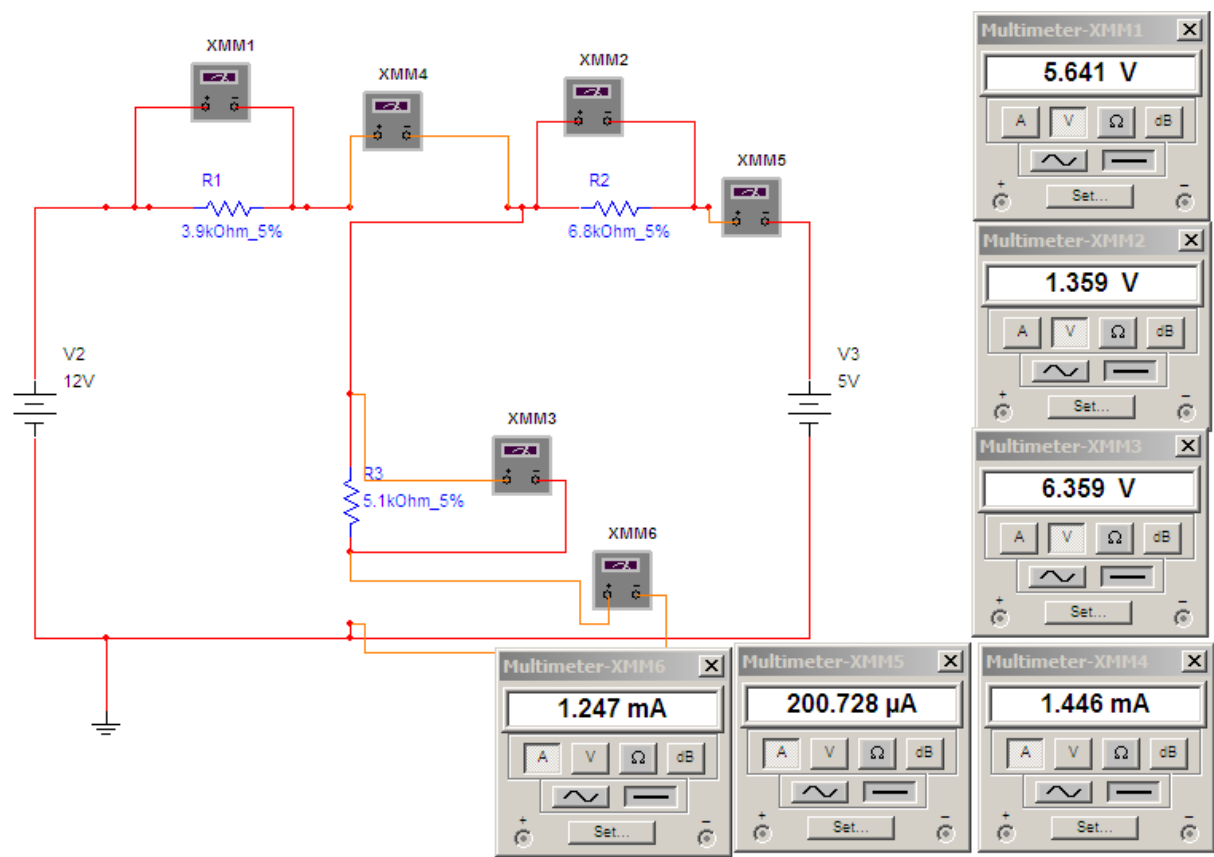$$9k\,I_1 - 1.02 = 12$$
$$+\ 1.02\ \ +1.02$$
$$\frac{9k\,I_1 = 13.02}{9k \qquad 9k}$$
$$I_1 = 0.001446 \qquad\qquad 1.446mA$$

| | | |
|---|---|---|
| R1 | $I_{R1} = 1446mA$ | $V_{R1} = I_{R1}\cdot R1 = 5.6394V$ |
| R3 | $I_{AB} = I_1 - I_2 = 1.246mA$ | $V_{R3} = I_{R3}\cdot AB = 6.3546V$ |
| R2 | $I_{R2} = 200\,uA$ | $V_{R2} = I_{R2}\cdot R2 = 1.36V$ |

**Schematic**

**BreadBoard**

|     | R1       | R2       | R3       |
|-----|----------|----------|----------|
| V   | 5.76 V   | 1.12 V   | 6.17 V   |
| I   | 1.52 mA  | 164 μA   | 1.38 mA  |
| R   | 3.9kOhm  | 6.8kOhm  | 4.7kOhm  |