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Electric Circuits (ENGR 210)

Lab Report 3

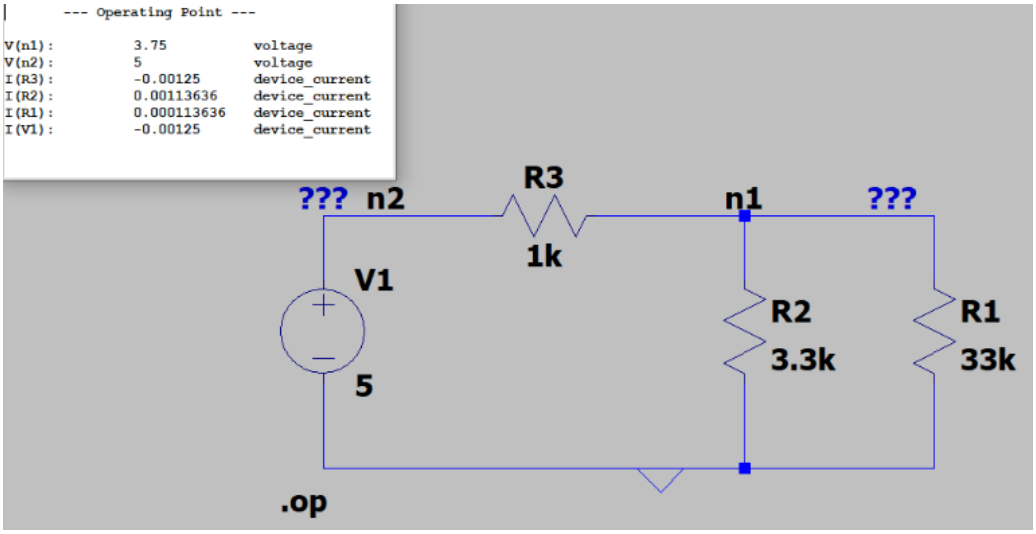

Figure 1

1. *Solution.* Using voltage divider rule:

$$v_{3k\Omega} = 5 \cdot \frac{3}{4} = 3.75\,\text{V} \tag{1}$$

$$I_1 = \frac{5 - 3.75}{1000} = 1.25\,\text{mA} \tag{2}$$

$$I_2 = \frac{3.75}{3.3 \times 10^3} = 1.136\,\text{mA} \tag{3}$$

$$I_3 = \frac{3.75}{33 \times 10^3} = 0.1136\,\text{mA} \tag{4}$$

$$. \tag{5}$$

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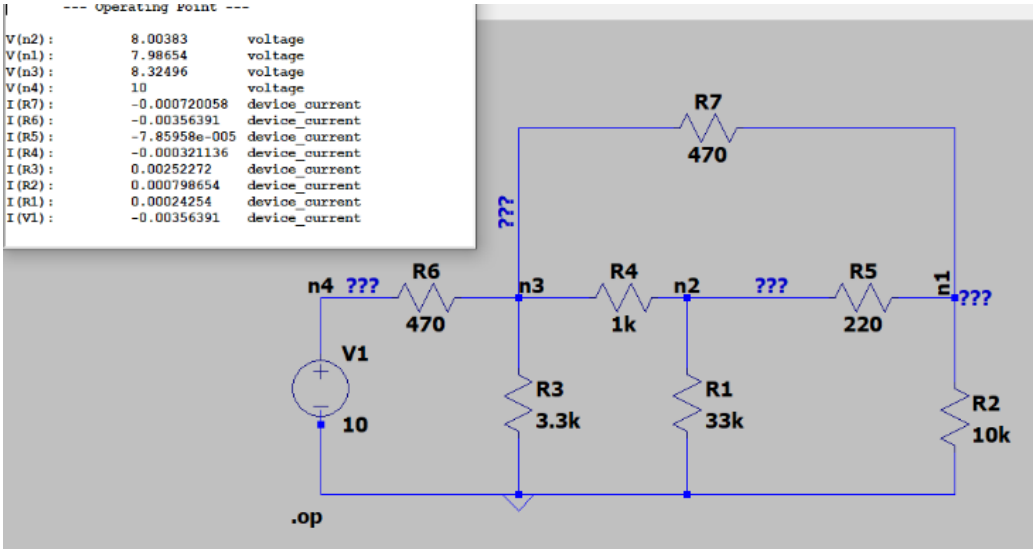

Figure 2

2. *Solution.* Using node analysis

$$\left(\frac{1}{1000}+\frac{1}{3300}+\frac{1}{470}\right)n_3-\frac{1}{470}(10)-\frac{1}{470}n_1-\frac{1}{1000}n_2=0 \tag{6}$$

$$-\frac{1}{220}n_1+\left(\frac{1}{1000}+\frac{1}{33000}+\frac{1}{220}\right)n_2-\frac{1}{1000}n_3=0 \tag{7}$$

$$\left(\frac{1}{10000}+\frac{1}{470}+\frac{1}{220}\right)n_1-\frac{1}{220}n_2-\frac{1}{470}n_3=0. \tag{8}$$

$$n_1=7.987\,\mathrm{V} \tag{9}$$

$$n_2=8.0038\,\mathrm{V} \tag{10}$$

$$n_3=8.3249\,\mathrm{V}. \tag{11}$$

$$I_{470}=\frac{1.68}{470}=0.00360\,\mathrm{A} \tag{12}$$

$$I_{3.3k\Omega}=\frac{v_3}{3300}=2.52\,\mathrm{mA} \tag{13}$$

$$I_{1k\Omega}=\frac{v_3-v_2}{1000}=0.321\,\mathrm{mA} \tag{14}$$

$$I_{33k\Omega}=\frac{v_2}{33000}=0.240\,\mathrm{mA} \tag{15}$$

$$I_{220\Omega}=\frac{v_2-v_1}{220}=0.00764\,\mathrm{mA} \tag{16}$$

$$I_{10\mathrm{V}}=\frac{v_1}{10}=0.7987\,\mathrm{mA}. \tag{17}$$

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