Name:  

**ECE 1050  homework # 22  Due: Fri, 11/21/03**

Fill in the blanks in the following circuits. Since these calculations are very simple, you may simply write down the answer without showing work.

1. \[ R \cong 330 \Omega \quad V_R = \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_ \_
6. \( I_T = \) \( V_{D1} = \) 

\[ \begin{array}{c}
\text{12V} \\
\text{R1} := 150 \Omega \\
\text{R2} := 820 \Omega \\
\text{R3} := 1 \text{k} \Omega \\
\end{array} \]

\( I_{D1} = \) 

\( I_{D2} = \) 

\( V_{D2} = \) 

\( I_{R1} = \) 

\( I_{R2} = \) 

\( I_{R3} = \)

7. \( I_T = \) \( V_{D1} = \)

\[ \begin{array}{c}
\text{12V} \\
\text{R1} := 150 \Omega \\
\text{R2} := 820 \Omega \\
\text{R3} := 1 \text{k} \Omega \\
\end{array} \]

\( I_{D1} = \)

\( I_{D2} = \)

\( V_{D2} = \)

\( I_{R1} = \)

\( I_{R2} = \)

\( I_{R3} = \)

8. \( V_R = \) \( R = \)

\[ \begin{array}{c}
\text{6V} \\
\text{LED} \\
\end{array} \]

\( I_D = 15 \text{mA} \)

9. \( R = \)

\[ \begin{array}{c}
\text{14V} \\
\text{ID} := 20 \text{mA} \\
\end{array} \]

10. \( I_{R1} := 30 \text{mA} \)

\[ \begin{array}{c}
\text{12V} \\
\text{R2} := 300 \Omega \\
\end{array} \]

\( R_1 = \)

\( I_{R2} := 20 \text{mA} \)

\( R_3 = \)
Warning: If $I_D$ turns out negative, it is actually 0 and you must recalculate everything else.

**Answers**

1. $V_D := 0.7 \text{ V}$ $V_R := 3.3 \text{ V}$ $I_D := 10 \text{ mA}$  
2. $I_D := 0 \text{ mA}$ $V_D := 4 \text{ V}$ $V_R := 0 \text{ V}$
3. $V_D := 0.7 \text{ V}$ $V_R := 7.3 \text{ V}$ $I := 14.3 \text{ mA}$  
4. $I := 0 \text{ mA}$ $V_D := -8 \text{ V}$ $V_D := 0 \text{ V}$ $V_R := 0 \text{ V}$
5. $V_{D1} := 0.7 \text{ V}$ $V_{D2} := -1.3 \text{ V}$ $I_1 := 42.3 \text{ mA}$  
6. $I_{D2} := 0 \text{ mA}$ $V_{D1} := 0.7 \text{ V}$ $V_{R2} := 13.8 \text{ mA}$ $I_{R1} := 1 \text{ mA}$
7. $V_{D1} := 0.7 \text{ V}$ $V_{D2} := 0.7 \text{ V}$ $I_{R1} := 0 \text{ mA}$  
8. $V_R := 4 \text{ V}$ $R := 267 \Omega$  
9. $R := 50 \Omega$
10. $R := 233 \Omega$ $R := 150 \Omega$
11. $I_D := 50 \text{ mA}$ $R := 120 \Omega$ $P_R := 0.3 \text{ W}$ $P_D := 0.6 \text{ W}$
12. $I_L := 40 \text{ mA}$ $I_R := 50 \text{ mA}$ $I_D := 10 \text{ mA}$ $P_R := 0.3 \text{ W}$ $P_D := 0.12 \text{ W}$
13. $I_D := 0 \text{ mA}$ $I_L := 56.3 \text{ mA}$ $V_L := 11.3 \text{ V}$ $P_R := 0.38 \text{ W}$ $P_D := 0 \text{ W}$