1. Find the value of the voltage source $V_S$ such that the 9V source neither absorbs nor supplies power.

2. Obtain the Thevenin and Norton Equivalents for the following circuit. That is, find $V_T$, $I_N$, and $R_T$.

3. Find the labeled current, $I_0$, in the following circuit.
4. In the following circuit, $V_s = 5V$ and the $V_{ON}$ for the diodes is 2V. Determine how many diodes are on.

![Diode Circuit](image)

5. In the following circuit, $V_{clip} = -3V$ and the $V_{ON}$ for the diodes is 1.5V. Determine the minimum and maximum values of the output voltage, $V_{out}$, and sketch the output waveform.

![Diode Circuit](image)

6. For the following circuit, $V_{BE,ON} = 0.4V$, $V_{CE,SAT} = 0.2V$, $R_B = 20k\Omega$, $R_C = 2k\Omega$ and $\beta = 100$. Find $V_{CE}$ for the following input voltages.

   a. $V_{in} = 0.3V$
   b. $V_{in} = 1.0V$
   c. $V_{in} = 1.4V$
   d. What is the smallest value of $V_{in}$ that puts the transistor into saturation?