4.3
(a) \[ V = 2V \]
(b) \[ I = \frac{5 - (1)}{2} = 2 mA \]

4.4
(a) \[ V_{p+i} = 10V \]
\[ V_i = 0V \]
\[ f = 1 kHz \]
(b) \[ V_{p-i} = 0V \]
\[ V_i = -10V \]
\[ f = 1 kHz \]
(c) \[ V_i = 0V \]
Neither \( D_1 \) nor \( D_2 \) conducts so there is no output.

4.4
(g) \[ V_{p+i} = 0V \]
\[ V_i = -10V \]
\[ f = 1 kHz \]
\( D_1 \) shorts to ground when \( \eta > 0 \) and is cut off when \( \eta < 0 \) whereby the output follows \( V_i \).
4.19

\[ i_1 = I_e \frac{e^{V_1/\alpha T} - 1}{e^{V_1/\alpha T} + 1} \]
\[ i_2 = I_e \frac{e^{V_2/\alpha T} - 1}{e^{V_2/\alpha T} + 1} \]
\[ \frac{i_2}{i_1} = \frac{e^{0.7/0.025} - 1}{e^{0.7/0.025} + 1} \]
\[ i_2 = 0.335 \, \mu A \]

4.23
The voltage across three diodes in series is 2.4 V, thus the voltage across each diode must be 0.8 V.

Using \[ I_0 = I_e e^{V_0/\alpha T} \], the required current is found to be 7.9 mA.

If 1 mA is drawn away from the circuit, \( I_0 \) will be 6.9 mA, which would give \( V_F = 0.794 \, \text{V} \), giving an output voltage of 2.39 V. Thus the change in output voltage is \( -1.15 \, \text{mV} \).

4.26
We can write the following KCL equations for the diode currents:
\[ I_{Q2} = 10 \, \text{mA} - \frac{V}{R} \]
\[ I_{Q1} = \frac{V}{R} \]
We can write the following KVL equations for the diode voltages:
\[ V = V_{Q1} - V_{Q2} \]
We can write the following diode equations:
\[ I_{Q2} = I_e e^{V_{Q2}/\alpha T} \]
\[ I_{Q1} = I_e e^{V_{Q1}/\alpha T} \]
Taking the ratio of the two equations above, we have:
\[ \frac{I_{Q2}}{I_{Q1}} = \frac{10 \, \text{mA} - \frac{V}{R}}{\frac{V}{R}} = e^{V_{Q2}/\alpha T - V_{Q1}/\alpha T} = e^{V/\alpha T} \]
To achieve \( V = 80 \, \text{mV} \), we need:
\[ \frac{I_{Q2}}{I_{Q1}} = e^{80 \times 10^{-3}/0.025} = 233 \]
Solving the above equation we have
\[ R = 194 \, \Omega \].