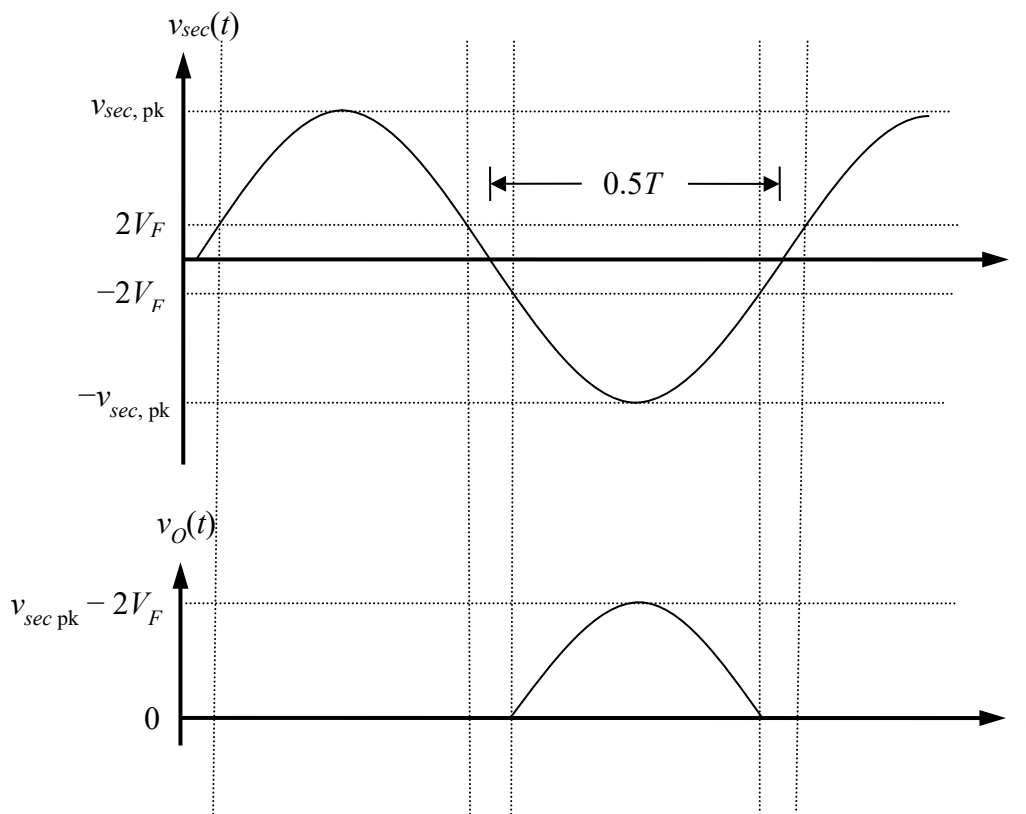


Selected Answers to Graded Problems in HW #4
[answer to Probs. 2 and 5a revised 10/15/26]

Remember to explain all answers in your solutions. You will not receive credit for merely repeating an answer given here. If an answer is not given below, it is either because the solution is trivial or because disclosure of the answer would reveal too much of the solution to the problem.

It is possible that one or more of the answers given below is incorrect. There is a trade-off between speed and accuracy. The faster that answers are posted, the more likely that a mistake could have been made in the rush to prepare them. You should develop the ability to evaluate the accuracy of any information that you rely on. If you suspect that an answer below is incorrect, please let me know as soon as possible.

1. $R_1 = 200\ \Omega$ and $R_2 = 130\ \Omega$
2. The current through R_L is zero whether the diodes are conducting or not; however, you must show why.
3.
 - a. [Answer not given]
 - b. The output waveform is plotted below the sinusoidal secondary winding voltage for reference below. Remember that you must show *why* the waveform looks like this and why it has the indicated peak voltage and start and stop times.



4. $R_{5a} = 75\ \text{k}\Omega$; $R_{5b\text{max}} = 225\ \text{k}\Omega$; $\text{CMRR}_{\text{min}} = 80\ \text{dB}$

(continued on next page)

5. a. $v_{od} = -6.1 \cos(10\pi t)$ V [This result was found using nominal resistor values to calculate the differential-mode gain; the voltage magnitude is therefore within 10% or so of the actual value. If the exact resistor values are used, then the magnitude is slightly different.]
b. $v_{ocm} = -0.0041 \cos(120\pi t)$ V
c. CMRR = 87 dB
d. CMRR_{min} = 72 dB
e. To improve CMRR_{min} by 20 dB, $\varepsilon_{2\max} = 0.5\%$
6. D_1 turns on when $V_{IN} = 5.0$ V
 D_2 turns on when $V_{IN} = 9.7$ V
When $V_{IN} = 15$ V, $I_{D1} = 20$ mA and $I_{D2} = 12$ mA