Chapter 11, Solution 33.

Determine the rms value for the waveform in Fig. 11.64.

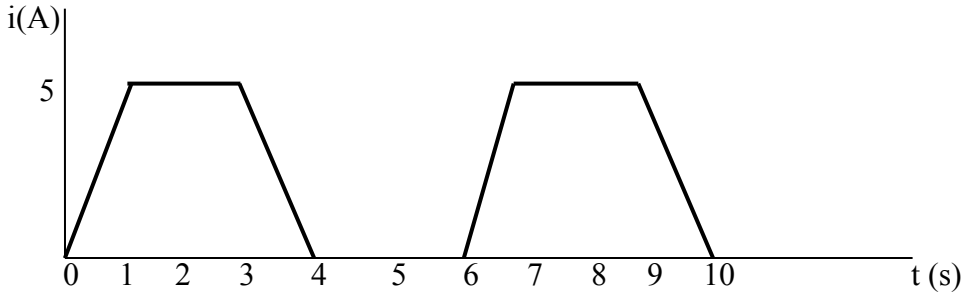

Figure 11.64
For Prob. 11.33.

Solution

$$I_{rms}^2 = \frac{1}{T}\int_0^T i^2(t)dt = \frac{1}{6}\left[\int_0^1 25t^2 dt + \int_1^3 25dt + \int_3^4 (-5t+20)^2 dt\right]$$

$$I_{rms}^2 = \frac{1}{6}\left[25\frac{t^3}{3}\Big|_0^1 + 25(3-1) + (25\frac{t^3}{3} - 100t^2 + 400t)\Big|_3^4\right] = 11.1056$$

$$I_{\text{rms}} = \mathbf{3.332\ A}$$