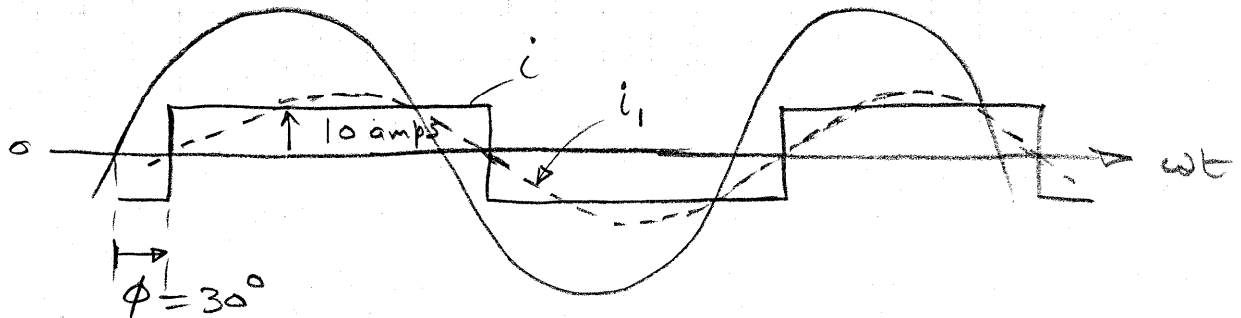


### Problem 3-6

$$V = \sqrt{2} V \sin \omega t, \quad V = 120 V$$

This problem is illustrated only for the waveform shown in Prob 3-3 a.



$$I_f = 0.9 \times 10 = 9 A \quad \text{from Prob 3-5}$$

$$\phi_1 = \phi, \therefore \text{DPF} = \cos \phi_1 = \cos \phi = \cos 30^\circ = 0.866$$

$$P = V I_f \cos \phi_1 = 120 \times 9 \times 0.866 = 935.28 W$$

$$I_{\text{rms}} = 10 A$$

$$\begin{aligned} \therefore \text{THD} &= \frac{\sqrt{I^2 - I_1^2}}{I_1} \times 100 \\ &= 48.43\% \end{aligned}$$