

**6.12** The electromagnetic generator shown in Fig. 6-12 is connected to an electric bulb with a resistance of  $50\ \Omega$ . If the loop area is  $0.1\ \text{m}^2$  and it rotates at 3,600 revolutions per minute in a uniform magnetic flux density  $B_0 = 0.4\ \text{T}$ , determine the amplitude of the current generated in the light bulb.

**Solution:** From Eq. (6.38), the sinusoidal voltage generated by the a-c generator is  $V_{\text{emf}} = A\omega B_0 \sin(\omega t + C_0) = V_0 \sin(\omega t + C_0)$ . Hence,

$$V_0 = A\omega B_0 = 0.1 \times \frac{2\pi \times 3,600}{60} \times 0.4 = 15.08 \quad (\text{V}),$$

$$I = \frac{V_0}{R} = \frac{15.08}{50} = 0.3 \quad (\text{A}).$$

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