1. (a) The value of ω such that the expression for $v_1(t)$ represents the waveform shown in Fig. 1(a):

$$\omega = \frac{2\pi}{L}$$

$$(v_{avg})_{fullcycle} = \frac{2A}{\pi} \qquad (v_{avg})_{halfcycle} = \frac{2A}{\pi}$$

$$v_{rms} = \frac{A}{\sqrt{2}}$$

(b)

$$(v_{avg})_{fullcycle} = \frac{A}{2} \qquad (v_{avg})_{halfcycle} = \frac{A}{4}$$

$$v_{rms} = \frac{A}{\sqrt{3}}$$

(c)

$$(v_{avg})_{fullcycle} = 0 \qquad (v_{avg})_{halfcycle} = \frac{A}{2}$$

$$v_{rms} = \frac{A}{\sqrt{3}}$$

(d)

$$(v_{avg})_{fullcycle} = 0 \qquad (v_{avg})_{halfcycle} = A$$

$$v_{rms} = A$$

(e)

$$(v_{avg})_{fullcycle} = A(2\alpha - 1) \qquad (v_{avg})_{halfcycle} = \begin{cases} (4\alpha - 1)A & \alpha < 0.5 \\ A & \alpha \geq 0.5 \end{cases}$$

$$v_{rms} = A$$

(f)

$$(v_{avg})_{fullcycle} = 0 \qquad (v_{avg})_{halfcycle} = \frac{20A}{9\pi}$$

$$v_{rms} = \frac{A\sqrt{205}}{12\sqrt{2}}$$