

Chapter 9, Solution 25.

(a)

$$2j\omega\mathbf{I} + 3\mathbf{I} = 4\angle 45^\circ, \quad \omega = 2$$

$$\mathbf{I}(3 + j4) = 4\angle 45^\circ$$

$$\mathbf{I} = \frac{4\angle 45^\circ}{3 + j4} = \frac{4\angle 45^\circ}{5\angle 53.13^\circ} = 0.8\angle -8.13^\circ$$

Therefore, $i(t) = \mathbf{800\cos(2t - 8.13^\circ) \text{ mA}}$

(b)

$$10\frac{\mathbf{I}}{j\omega} + j\omega\mathbf{I} + 6\mathbf{I} = 5\angle 22^\circ, \quad \omega = 5$$

$$(-j2 + j5 + 6)\mathbf{I} = 5\angle 22^\circ$$

$$\mathbf{I} = \frac{5\angle 22^\circ}{6 + j3} = \frac{5\angle 22^\circ}{6.708\angle 26.56^\circ} = 0.745\angle -4.56^\circ$$

Therefore, $i(t) = \mathbf{745 \cos(5t - 4.56^\circ) \text{ mA}}$