

Chapter 10, Solution 3.

$$\omega = 4$$

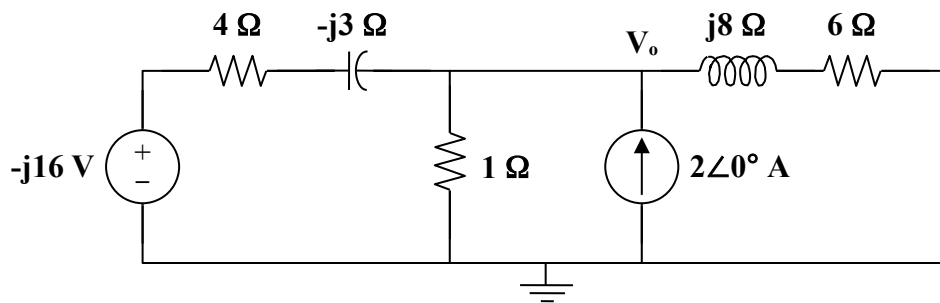
$$2 \cos(4t) \longrightarrow 2 \angle 0^\circ$$

$$16 \sin(4t) \longrightarrow 16 \angle -90^\circ = -j16$$

$$2 \text{ H} \longrightarrow j\omega L = j8$$

$$1/12 \text{ F} \longrightarrow \frac{1}{j\omega C} = \frac{1}{j(4)(1/12)} = -j3$$

The circuit is shown below.



Applying nodal analysis,

$$\frac{-j16 - V_o}{4 - j3} + 2 = \frac{V_o}{1} + \frac{V_o}{6 + j8}$$

$$\frac{-j16}{4 - j3} + 2 = \left(1 + \frac{1}{4 - j3} + \frac{1}{6 + j8}\right) V_o$$

$$V_o = \frac{3.92 - j2.56}{1.22 + j0.04} = \frac{4.682 \angle -33.15^\circ}{1.2207 \angle 1.88^\circ} = 3.835 \angle -35.02^\circ$$

Therefore,

$$v_o(t) = 3.835 \cos(4t - 35.02^\circ) \text{ V}$$