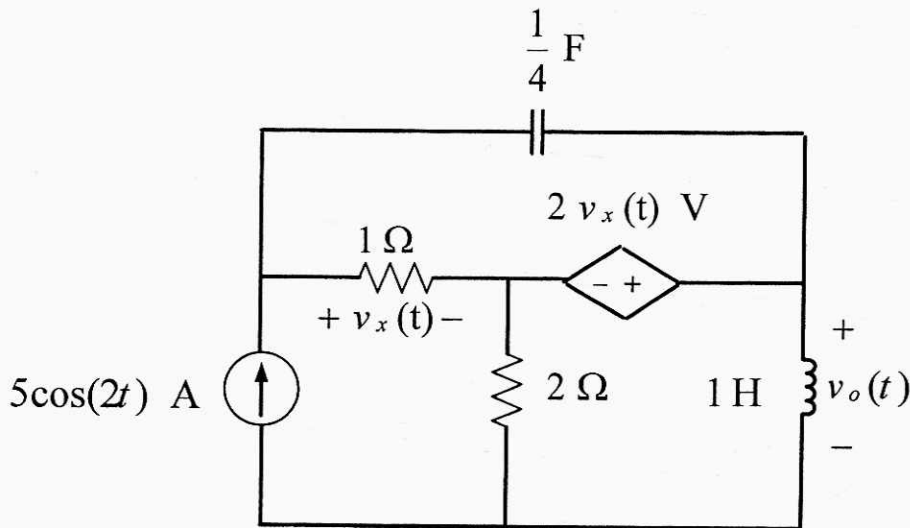


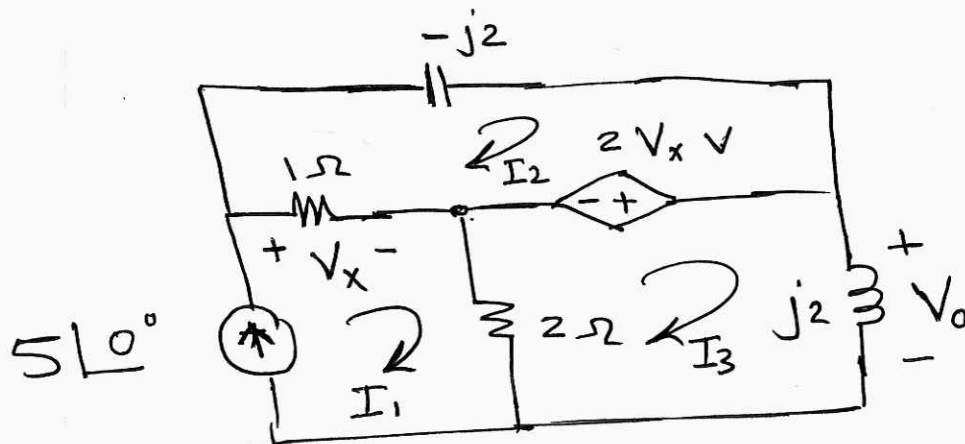
EE 202-02-Fall 2013(131)
QZ6

Sec	Ser	ID	Name
			KEY



For the circuit shown above, using **mesh method** only find $v_o(t)$?

Source sinusoidal \Rightarrow phasor domain



$I_1 = 5 \angle 0^\circ$ by inspection

KVL on mesh ② $(-j2)I_2 + 2V_x - V_x = 0$

$(-j2)I_2 + V_x = 0$

since $V_x = 1(5 \angle 0^\circ - I_2)$

$\Rightarrow (-j2)I_2 + 5 \angle 0^\circ - I_2 = 0 \Rightarrow I_2 = \frac{5 \angle 0^\circ}{1 + j2}$

$I_2 = 1 - j2 = 2.236 \angle -63.43^\circ \text{ A}$

\Rightarrow

KVL on mesh (3)

$$-2V_x + (j2)I_3 + 2(I_3 - 5\angle 0^\circ) = 0$$

$$V_x = 2(5\angle 0^\circ - 2.236\angle -63.43^\circ) \\ = 2\sqrt{5}\angle 26.56^\circ = 4.472\angle 26.56^\circ$$

$$\Rightarrow I_3 = \frac{2\sqrt{5}\angle 26.56^\circ + 5\angle 0^\circ}{2 + j2} \\ = 6.52\angle -32.47^\circ \text{ A}$$

$$\Rightarrow V_o = (j2)I_3 \\ = (j2)(6.52\angle -32.47^\circ) \\ = 13.03\angle 57.528^\circ$$

$$\Rightarrow v_o(t) = 13.03 \cos(2t + 57.528^\circ) \text{ V}$$