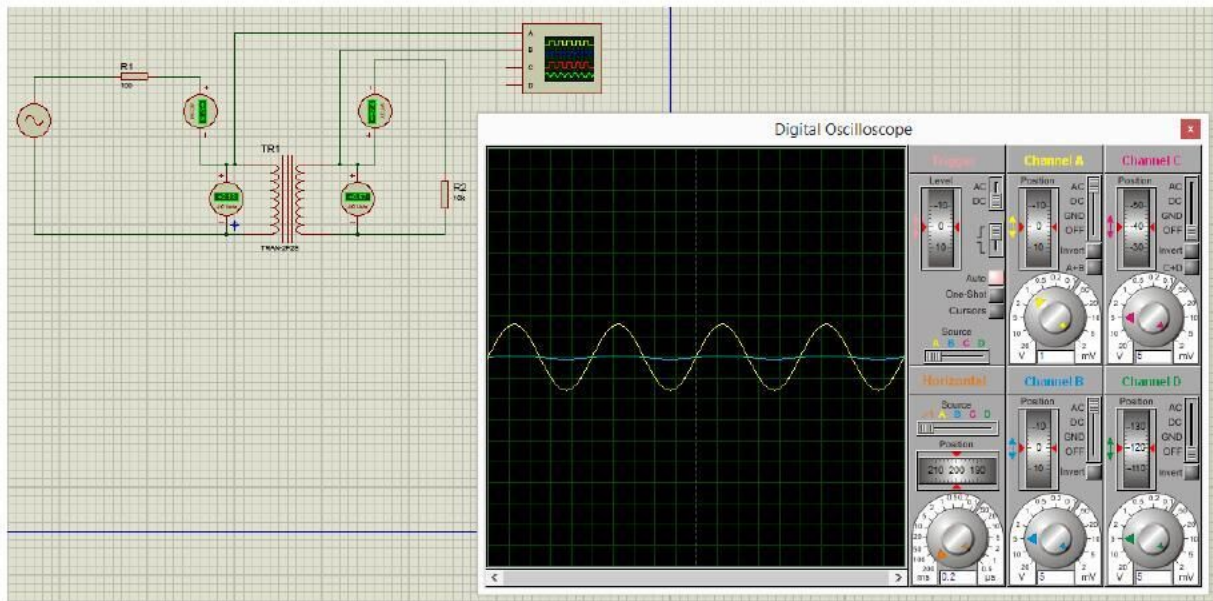
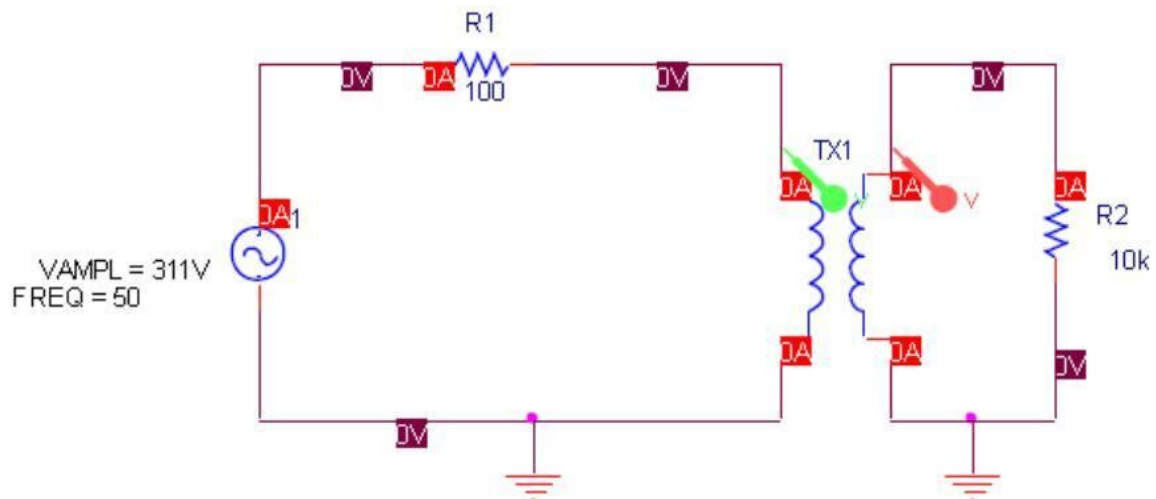




A)



$$M = k (L1.L2)^{1/2} = 1(20.2000)^{1/2} = 200$$

$$f = 50 \text{ Hz}, \omega = 2 \cdot (3.14) \cdot (50) = 314 \text{ rad/s}$$

$$j\omega M = j62800$$

$$zL1 = j\omega L1 = j6280$$

$$zL2 = j\omega L2 = j628000$$

$$1: -311 \angle 0^\circ + I1(100 + j6280) - I2(j62800) = 0$$

$$2: I2(10000 + j628000) - I1(j6280) = 0$$

$$2: I_2(628079,61 \angle 89.09^\circ) = I_1(6280 \angle 90^\circ)$$

$$I_1 = (100.01 \angle -0.91^\circ) I_2$$

$$1: (6280.80 \angle 89.09^\circ)(100.01 \angle -0.91^\circ) I_2 - (62800 \angle 90^\circ) I_2 = 311 \angle 0^\circ$$

$$I_2(628142.81 \angle 88.18^\circ - 62800 \angle 90^\circ) = 311 \angle 0^\circ$$

$$I_2 = 55.01 \angle -87.98^\circ \text{ mA}$$

$$I_1 = 5.50 \angle -88.98^\circ \text{ A}$$

$$V_1 = I_1 \cdot Z_{L1} = (5.50 \angle -88.98^\circ) \cdot (j6280) = 34540 \angle -1.02^\circ \text{ V}$$

$$V_2 = I_2 \cdot Z_{L2} = (55.01 \angle -87.98^\circ \times 0.001) \cdot (j628000) = 34546.28 \angle 2.02^\circ \text{ V}$$

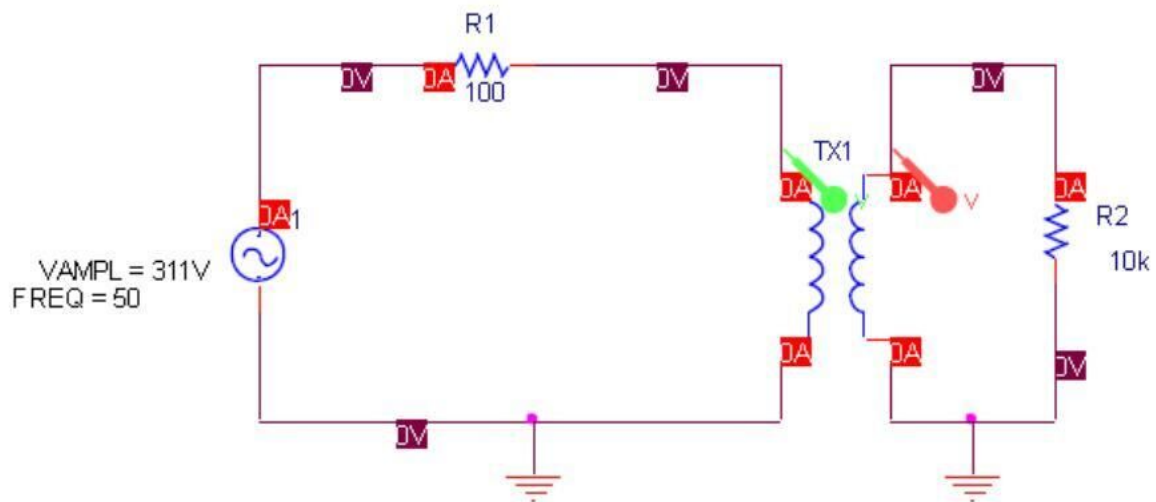
$$i_1(t) = 5.50 (\cos 314t - 87.98^\circ) \text{ A}$$

$$i_2(t) = 55.01 (\cos 314t - 88.98^\circ) \text{ mA}$$

$$v_1(t) = 34540 (\cos 314t - 1.02^\circ) \text{ V}$$

$$v_2(t) = 34546.28 (\cos 314t - 2.02^\circ) \text{ V}$$

B)



$$M = 0.85(10.1)^{1/2} = 2.69$$

$$\omega = 2 \cdot (3.14) \cdot 50 = 314 \text{ rad/s}, f = 50 \text{ Hz},$$

$$Z_{L1} = j\omega L1 = j3140$$

$$Z_{L2} = j\omega L2 = j314$$

$$j\omega M = j844.66$$

$$1: -311 \angle 0^\circ + I1(100 + j3140) - I2(j314) = 0$$

$$2: I2(10000 + j314) - (j3140)I1 = 0$$

$$2: I2(10481.39 \angle 17.43^\circ) = I1(3140 \angle 90^\circ)$$

$$I1 = (3.34 \angle -72.57^\circ) I2$$

$$1: (100 + j3140) \cdot (3.34 \angle -72.57^\circ) I2 - (j314) I2 = 311 \angle 0^\circ$$

$$(3141.59 \angle 88.18^\circ)(3.34 \angle -72.57^\circ) I2 - (j314) I2 = 311 \angle 0^\circ$$

$$(10492.91 \angle 15.61^\circ) I2 - (j314) I2 = 311 \angle 0^\circ$$

$$(10105.89 + j2509.52) I2 = 311 \angle 0^\circ \Rightarrow (10412.81 \angle 13.95^\circ) I2 = 311 \angle 0^\circ$$

$$I2 = 29.87 \angle -13.95^\circ \text{ mA}$$

$$I1 = (3.34 \angle -72.57^\circ)(29.87 \angle -13.95^\circ \times 0.001) = 99.77 \angle -86.52^\circ \text{ mA}$$

$$V_1 = I_1 \cdot Z_{L1} = (99.77 \angle -86.52^\circ \times 0.001) \cdot (j3140) = 313.28 \angle 3.48^\circ \text{ V}$$

$$V_2 = I_2 \cdot Z_{L2} = (29.87 \angle -13.95^\circ \times 0.001) \cdot (j314) = 9.38 \angle 76.05^\circ \text{ V}$$

$$i_1(t) = 99.77 (\cos 314t - 86.52) \text{ mA}$$

$$i_2(t) = 29.87 (\cos 314t - 13.95) \text{ mA}$$

$$v_1(t) = 313.28 (\cos 314t + 3.48) \text{ V}$$

$$v_2(t) = 9.38 (\cos 314t + 76.05) \text{ V}$$