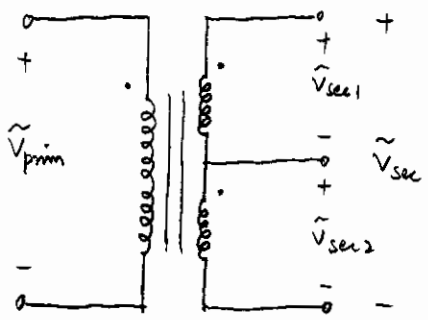
ECE301 HW#8

7.31 Solution:

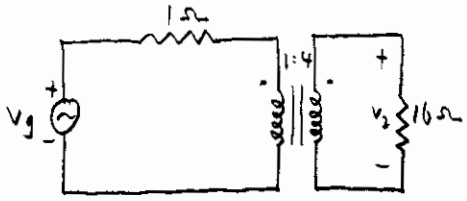


a. $P_{prim} = P_{sec1} + P_{sec2} = 5kw + 5kw = 10kW$

b. $\tilde{I} = \frac{S}{\tilde{V}} = \frac{10^4}{120} = 83.3$

$\tilde{I}_{prim} = 83.3 \angle 0^\circ A$

7.33 Solution:

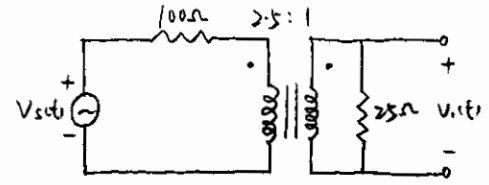


a. $R_{total} = 1 + \frac{16}{4^2} = 2\ \Omega$

b. $\tilde{I}_{prim} = \frac{\tilde{V}_g}{R_{total}} = \frac{120}{2} = 60\ A$

c. $P_{prim} = \tilde{V}_g \cdot \tilde{I}_{prim} = 120 \times 60 = 7200\ w$

7.36 Solution:



a. $V_{s\,rms} = \frac{294}{\sqrt{2}} = 207.9$ V

$\tilde{I}_{prim} = \frac{\tilde{V}_s}{100 + 25 \times 2.5^2} = \frac{207.9}{256.25} = 0.81$ A

b. $\tilde{V}_o = R_2 \cdot (2.5\,\tilde{I}_{prim}) = 25 \times 2.5 \times 0.81 = 50.6$ V

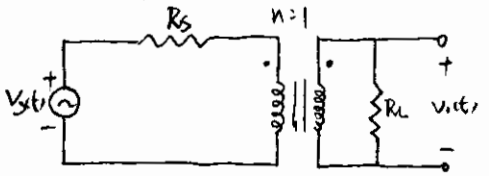
$v_o(t) = \sqrt{2} \times 50.6 \cos(377t)$

$= 71.6 \cos(377t)$ V

c. $P_{sec} = \tilde{V}_o \cdot (2.5\,\tilde{I}_{prim}) = 50.6 \times 2.5 \times 0.81 = 102.5$ W

d. $\frac{P_{load}}{P_{source}} = \frac{R_2 \times 2.5^2}{R_1 + R_2 \times 2.5^2} = \frac{156.25}{256.25} = 0.61$

7.37 Solution:



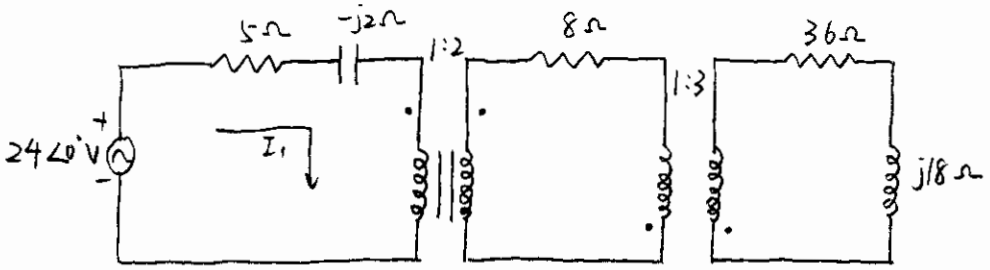
To provide maximum power transfer to the load,

Let $R_S = R_L \cdot n^2$

$n = \sqrt{\frac{R_S}{R_L}} = \sqrt{\frac{1800}{8}} = 15$

$N = \frac{1}{n} = \frac{1}{15}$

EX # 1 Solution:



$$Z_{in} = \left[(36+j18)\cdot\frac{1}{3^2} + 8\right]\cdot\frac{1}{2^2} + 5 - j2$$

$$= [12 + j2]\cdot\frac{1}{2^2} + 5 - j2$$

$$= 3 + j0.5 + 5 - j2$$

$$= (8 - j1.5)\ \Omega$$

$$\tilde{I}_1 = \frac{\tilde{V}}{Z_{in}} = \frac{24\angle 0^\circ}{8 - j1.5} = \frac{24\angle 0^\circ}{8.14\angle -10.62^\circ} = 2.95\angle 10.62^\circ \quad A$$