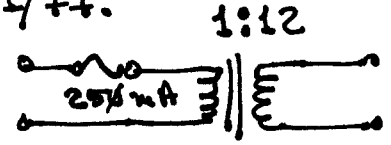
PP3.1/77.



$I_{fuse} = 250\,mA$

$I_S = \frac{N_P}{N_S} \times I_P$

$I_S = \frac{1}{12} \times 250\,mA$

$\boxed{I_S = 20.8\,mA}$

PP 3.2/82.

$N_P = 10$ $N_S = 1$ transformer Turns

$V_{P(pk)} = 180V$

$V_{S(pk)} = \frac{N_S}{N_P} \times V_{P(pk)}$

$V_{S(pk)} = \frac{1}{10} \times 180V$

$\boxed{V_{S(pk)} = 18.0V}$

$V_{L(pk)} = 18.0V - 0.7V$

$\boxed{V_{L(pk)} = 17.3V}$

PP 3.3/82.

$V_T = 12 V_{AC}$ transformer

$$V_{S(pk)} = V_T / 0.707$$

$$V_{S(pk)} = 12V / 0.707$$

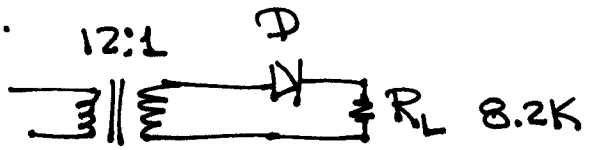
$$\boxed{V_{S(pk)} = 16.98V}$$

$$V_{L(pk)} = V_{S(pk)} - V_F$$

$$V_{L(pk)} = 16.98V - 0.7V$$

$$\boxed{V_{L(pk)} = 16.28V}$$

PP3.4/85.



$N_p = 12 \quad N_s = 1 \quad R_L = 8.2K$

$$V_{s(pk)} = \frac{N_p}{N_s} \times \frac{120V}{0.707}$$

$$V_{s(pk)} = \frac{1}{12} \cdot \frac{120V}{0.707}$$

$$\boxed{V_{s(pk)} = 14.14V}$$

$$V_{L(pk)} = V_{s(pk)} - V_F$$

$$V_{L(pk)} = 14.14V - 0.7V$$

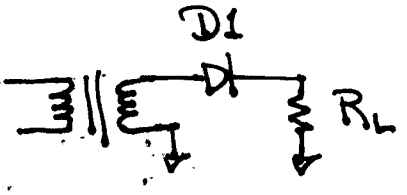
$$\boxed{V_{L(pk)} = 13.44V}$$

$$I_{L(pk)} = V_{L(pk)} / R_L$$

$$I_{L(pk)} = 13.44V / 8.2K$$

$$\boxed{I_{L(pk)} = 1.64mA}$$

PP3.5/84.



$N_p = 14 \quad N_s = 1 \quad R_L = 8.2K$

$$V_{P(pk)} = V_{P(rms)} / 0.707$$

$$V_{P(pk)} = 120V / 0.707$$

$$\boxed{V_{P(pk)} = 169.7V}$$

$$V_{S(pk)} = \frac{N_s}{N_p} V_{P(pk)}$$

$$V_{S(pk)} = \frac{1}{14} \cdot V_{P(pk)} = \frac{1}{14} \cdot 169.7V$$

$$\boxed{V_{S(pk)} = 12.12V}$$

$$V_{L(pk)} = 12.12V - 0.7V$$

$$\boxed{V_{L(pk)} = 11.42V}$$

$$V_{avg} = V_{L(pk)} / \pi$$

$$V_{avg} = 11.42V / 3.14$$

$$\boxed{V_{avg} = 3.64V}$$

PP 3.6/84.

half wave rectifier

$V_{avg} = 24V$

$R_L = 2.2k\Omega$

$I_{avg} = V_{avg} / R_L$

$I_{avg} = 24V / 2.2K$

$$\boxed{I_{avg} = 10.9mA}$$

PP 3.7/84.

half wave rectifier $48V_{ac}$ $R_L = 12K$

$V_{S(pk)} = 48V_{ac} / 0.707 = 67.89V$

$V_{L(pk)} = V_{S(pk)} - 0.7V = 67.19V$

$I_{L(pk)} = V_{L(pk)} / R_L = \frac{67.19V}{12K} = 5.66mA$

$$\boxed{I_{avg} = I_{L(pk)} / \pi = 1.80mA}$$

PP 3.8/86.

negative half wave rectifier $36V_{ac}$ transformer

$V_{s(pk)} = 36V_{ac} / 0.707 = 50.92V$

$V_{L(pk)} = V_{s(pk)} - 0.7V = 50.22V$

$V_{avg} = V_{L(pk)} / \pi = 50.22V / \pi = \cancel{16.21V}$ 15.99

$\boxed{V_{s(pk)} = -50.92V}$

$\boxed{V_{L(pk)} = -50.22V}$

$\boxed{V_{avg} = \cancel{-16.21V}}$

$\boxed{V_{avg} = -15.99V}$

calculator error = human error

PP 3.9/89.

full wave rectifier with 24 V_{ac} center tapped transformer

$$V_{S(pk)} = \frac{24\ V}{0.707}$$

$$\boxed{V_{S(pk)} = 33.95\ V}$$

$$V_{L(pk)} = \frac{V_{S(pk)}}{2} - 0.7V$$

$$\boxed{V_{L(pk)} = 16.27V}$$

$$V_{avg} = 2V_{L(pk)}/\pi$$

$$V_{avg} = 2 \cdot 16.27V/\pi$$

$$\boxed{V_{avg} = 10.36V}$$

PP3.1Ø/9Ø.

practice problem 3.9 has 2.2K load

$$I_{L(pk)} = \frac{V_{L(pk)}}{R_L} = \frac{16.27V}{2.2K}$$

$$\boxed{I_{L(pk)} = 7.4Ø\ mA}$$

$$I_{avg} = V_{avg}/R_L$$

$$I_{avg} = 1Ø.36V/2.2K$$

$$\boxed{I_{avg} = 4.71\ mA}$$

pp 3.11 / 94.

bridge rectifier with 18 V_{ac} transformer and 1.2k load

$$V_{s(pk)} = \frac{18\,V_{ac}}{0.707}$$

$$\boxed{V_{s(pk)} = 25.46V}$$

$$V_{L(pk)} = V_{s(pk)} - 1.4V$$

$$V_{L(pk)} = 25.46V - 1.4V$$

$$\boxed{V_{L(pk)} = 24.06V}$$

$$V_{avg} = 2\,V_{L(pk)} / \pi$$

$$V_{avg} = 2 \cdot 24.06V / \pi$$

$$\boxed{V_{avg} = 15.32V}$$

$$I_{avg} = V_{avg} / R_L$$

$$I_{avg} = 15.32V / 1.2K$$

$$\boxed{I_{avg} = 12.76\,mA}$$

PP3.13/100.

using MDA2502 bridge rectifier with $12V_{ac}$ transformer and load resistor $150\,\Omega$.

$$V_{S(pk)} = V_{ac}/0.707$$

$$\boxed{V_{S(pk)} = 16.97V}$$

$$V_{L(pk)} = V_{S(pk)} - 2V_F$$

$$V_{L(pk)} = 16.97V - 2\cdot 0.95V$$

$$\boxed{V_{L(pk)} = 15.07V}$$

$$V_{avg} = 2\cdot V_{L(pk)}/\pi$$

$$V_{avg} = 2\cdot 15.07V/\pi$$

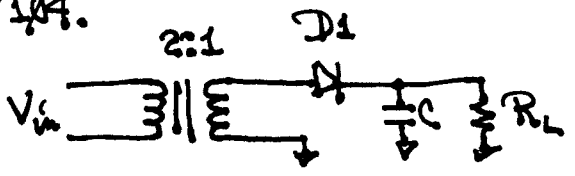
$$\boxed{V_{avg} = 9.59V}$$

$$I_{avg} = V_{avg}/R_L$$

$$I_{avg} = 9.59V/150\,\Omega$$

$$\boxed{I_{avg} = 64.0mA}$$

PP 3.14/1.14.



$$V_{in} = 170 V_{pk}$$

$$V_{S(pk)} = \frac{N_S}{N_P} V_{in}$$

$$V_{S(pk)} = 1/2 \cdot 170 V$$

$$\boxed{V_{S(pk)} = 85V}$$

$$I_{surge} = \frac{V_{S(pk)}}{R_W + R_B}$$

$R_W = 0.5\,\Omega \qquad R_B = 8\,\Omega$

$$I_{surge} = \frac{85V}{0.5\Omega + 8\Omega}$$

$$I_{surge} = \frac{85V}{8.5\Omega}$$

$$\boxed{I_{surge} = 10.0A}$$

PP 3.22/117.

using figure 3.48

$V_s = 24V_{ac}$ $C = 470\mu F$ $R_s = 500\Omega$ $V_z = 10V$ $Z_z = 20\Omega$
$R_L = 5.1K$

$$V_{s(pk)} = V_s / 0.707 = 33.95V$$

$$\boxed{V_{pk} = V_{s(pk)} - 1.4V = 32.55V}$$

$$I_R = \frac{V_{in} - V_z}{R_s} = \frac{32.55V - 10V}{R_s}$$

$$I_R = 45.1mA$$

$$V_r = \frac{I_R t}{C} = \frac{45.1mA \cdot 8.33mS}{470\mu F}$$

$$\boxed{V_r = 799.3mV}$$

$$V_{dc} = V_z = 10V$$

$$I_L = V_z / R_L = 10V / 5.1K$$

$$\boxed{I_L = 1.96mA}$$

$$V_{r(out)} = \frac{(Z_z \| R_L)}{(Z_z \| R_L + R_s)} \cdot V_r$$

$$V_{r(out)} = \frac{19.23}{19.23 + 500} \cdot 799.3mV$$

$$\boxed{V_{r(out)} = 29.60\,mV}$$