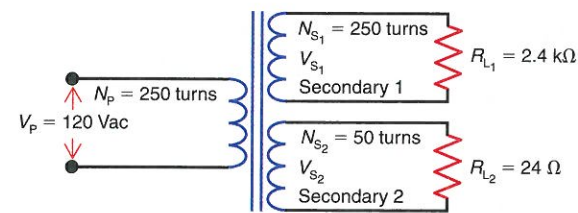


Figure 19-36

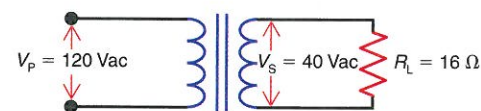


19-22 In Fig. 19-36, calculate the primary current, I_p , if R_{L1} opens.

19-23 In Fig. 19-37, solve for

- the turns ratio $\frac{N_p}{N_s}$.
- the secondary current, I_s .
- the primary current, I_p .

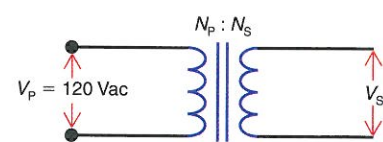
Figure 19-37



19-24 In Fig. 19-38, what turns ratio, $\frac{N_p}{N_s}$, is required to obtain a secondary voltage of

- 60 Vac?
- 600 Vac?
- 420 Vac?
- 24 Vac?
- 12.6 Vac?

Figure 19-38



19-25 A transformer delivers 400 W to a load connected to its secondary. If the input power to the primary is 500 W, what is the efficiency of the transformer?

19-26 Explain the advantages of a transformer having an isolated secondary.

SECTION 19-7 TRANSFORMER RATINGS

19-27 How is the power rating of a transformer specified?

19-28 To avoid overloading a transformer, what two rules should be observed?

19-29 What is the purpose of phasing dots on the schematic symbol of a transformer?

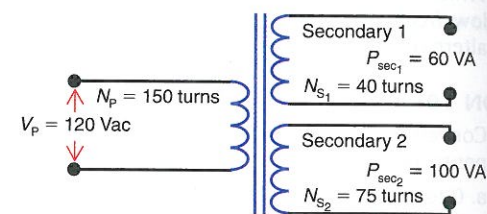
19-30 Assume that a 6-Ω load is connected to the secondary in Fig. 19-15b and c. How much is the current in each individual primary winding in

- Fig. 19-15b?
- Fig. 19-15c?

19-31 Refer to Fig. 19-39. Calculate the following:

- V_{sec1} .
- V_{sec2} .
- the maximum allowable current in secondary 1.
- the maximum allowable current in secondary 2.
- the maximum allowable primary current.

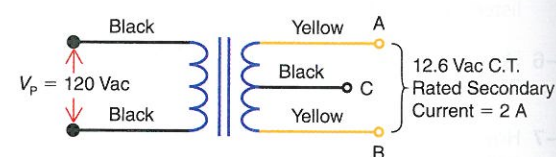
Figure 19-39



19-32 Refer to the transformer in Fig. 19-40. How much voltage would a DMM measure across the following secondary leads if the secondary current is 2 A?

- V_{AB} .
- V_{AC} .
- V_{BC} .

Figure 19-40



19-33 How much is the primary current, I_p , in Fig. 19-40 if the secondary current is 2 A?

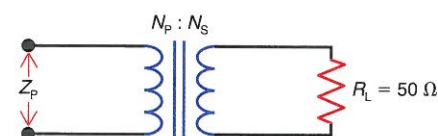
19-34 Repeat Prob. 19-32 if the secondary is unloaded.

SECTION 19-8 IMPEDANCE TRANSFORMATION

19-35 In Fig. 19-41, calculate the primary impedance, Z_p , for a turns ratio $\frac{N_p}{N_s}$ of

- 2:1.
- 1:2.
- 11.18:1.
- 10:1.
- 1:3.16.

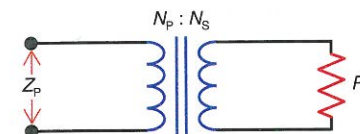
Figure 19-41



19-36 In Fig. 19-42, calculate the required turns ratio $\frac{N_p}{N_s}$ for

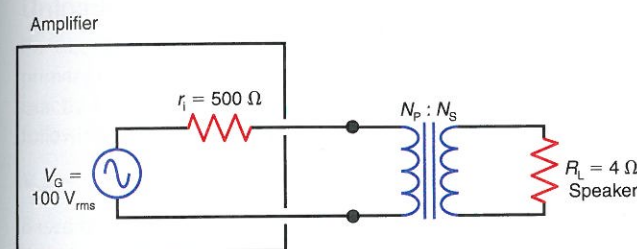
- $Z_p = 10 \text{ k}\Omega$ and $R_L = 75 \Omega$.
- $Z_p = 100 \Omega$ and $R_L = 25 \Omega$.
- $Z_p = 100 \Omega$ and $R_L = 10 \text{ k}\Omega$.
- $Z_p = 1 \text{ k}\Omega$ and $R_L = 200 \Omega$.
- $Z_p = 50 \Omega$ and $R_L = 600 \Omega$.
- $Z_p = 200 \Omega$ and $R_L = 10 \Omega$.

Figure 19-42



19-37 In Fig. 19-43, what turns ratio, $\frac{N_p}{N_s}$, will provide maximum transfer of power from the amplifier to the 4-Ω speaker?

Figure 19-43



19-38 Using your answer from Prob. 19-37, calculate

- the primary impedance, Z_p .
- the power delivered to the 4-Ω speaker.
- the primary power.

Critical Thinking

19-48 Derive the formula:

$$Z_p = \left(\frac{N_p}{N_s}\right)^2 \times Z_s$$

19-49 Calculate the primary impedance Z_p in Fig. 19-44.

SECTION 19-12 INDUCTANCES IN SERIES OR PARALLEL

19-39 Calculate the total inductance, L_T , for the following combinations of series inductors. Assume no mutual induction.

- $L_1 = 5 \text{ mH}$ and $L_2 = 15 \text{ mH}$.
- $L_1 = 12 \text{ mH}$ and $L_2 = 6 \text{ mH}$.
- $L_1 = 220 \mu\text{H}$, $L_2 = 330 \mu\text{H}$, and $L_3 = 450 \mu\text{H}$.
- $L_1 = 1 \text{ mH}$, $L_2 = 500 \mu\text{H}$, $L_3 = 2.5 \text{ mH}$, and $L_4 = 6 \text{ mH}$.

19-40 Assuming that the inductor combinations listed in Prob. 19-39 are in parallel rather than series, calculate the equivalent inductance, L_{EQ} . Assume no mutual induction.

19-41 A 100-mH and 300-mH inductor are connected in series-aiding and have a mutual inductance, L_M , of 130 mH. What is the total inductance, L_T ?

19-42 If the inductors in Prob. 19-41 are connected in a series-opposing arrangement, how much is L_T ?

19-43 A 20-mH and 40-mH inductor have a coefficient of coupling, k , of 0.4. Calculate L_T if the inductors are

- series-aiding.
- series-opposing.

19-44 Two 100-mH inductors in series have a total inductance, L_T , of 100 mH when connected in a series-opposing arrangement and 300 mH when connected in a series-aiding arrangement. Calculate

- L_M .
- k .

SECTION 19-13 ENERGY IN A MAGNETIC FIELD OF INDUCTANCE

19-45 Calculate the energy in joules stored by a magnetic field created by 90 mA of current in a 60-mH inductor.

19-46 Calculate the energy in joules stored by a magnetic field created by 200 mA in a 5-H inductor.

19-47 A current of 3 A flows in a coil with an inductance of 150 mH. How much energy is stored in the magnetic field?

Figure 19-44 Circuit for Critical Thinking Prob. 19-49.

