Tutorial 7

Example 1

- A transformer has a primary coil and a secondary coil with the number of loops are 500 and 5000. Input voltage is 220 V. What is the output voltage?

Solution

- Primary coil (N_P) = 500 loops
- Secondary coil (N_s) = 5000 loops
- Primary voltage (V_P) = 220 Volt
- Secondary voltage (V_S) = ?

- Solution :
- $V_s / N_s = V_p / N_p$
- $V_s / 5000 = 220 / 500$
- $V_s / 5000 = 0.44$
- $V_s = (0.44)(5000)$
- V_s = 2200 Volt

Example 2

- A transformer has primary coil with 1200 loops and secondary coil with 1000 loops. If the current in the primary coil is 4 Ampere, then what is the the current in the secondary coil.

Solution

- Solution :
- $I_S/I_P = N_P/N_S$
- The current in the secondary coil :
- $I_S/4 = 1200/1000$
- $I_S/4 = 1.2$
- $I_S = 1.2\ (4)$
- $I_S = 4.8$ Ampere

Example 3

- The secondary voltage is 220 Volt and primary voltage is 110 volt, then a comparison of the secondary coil and primary coil is…

Solution

Given :

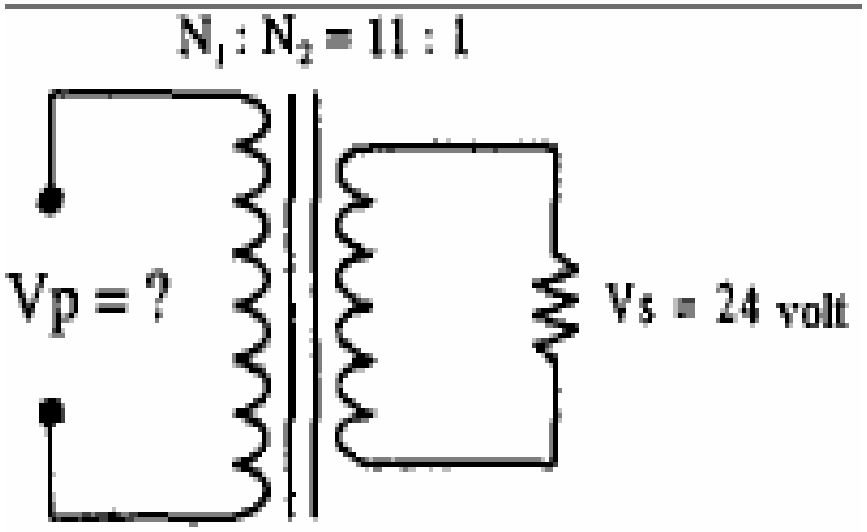
- Secondary voltage (V_S) = 220 Volt
- Primary voltage (V_P) = 110 Volt

Required N_S/N_P

- Solution :
- $V_S/V_P = N_S/N_P$
- $220/110 = N_S/N_P$
- $22/11 = N_S/N_P$
- $2/1 = N_S/N_P$
- $12/6 = N_S/N_P$

Example 4

- Based on figure below, what is the primary voltage of the transformer.



Solution

Given :

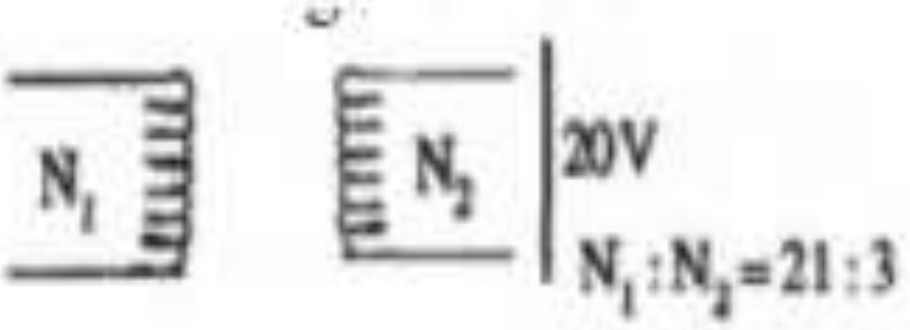
- Secondary voltage (V_S) = 24 Volt
- Primary loops (N_P or N_1) = 11 N
- Secondary loops ($N_{S\ or}$ N_2) = 1 N = N

  Primary voltage (V_P) = ?

- Solution :
- $V_s / N_s = V_p / N_p$
- $24 / 1 = V_p / 11$
- $24 = V_p / 11$
- $V_p = (24)(11)$
- V_p = 264 Volt

Example 5

- Based on figure below, what is the input voltage of the transformer



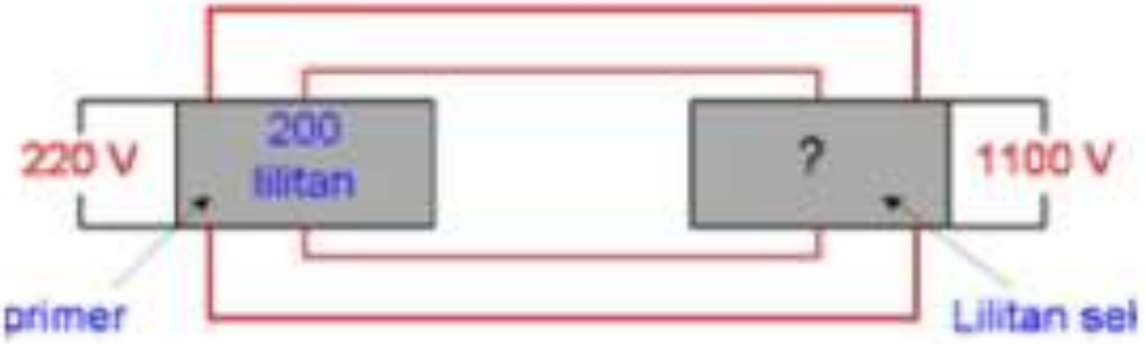
Solution

Given :

- Primary coil (N_1) = 21 N
- Secondary coil (N_2) = 3 N
- Secondary voltage (V_2) = 20 Volt
- Primary voltage (V_1) = ?
- Solution :
- $V_2 / N_2 = V_1 / N_1$
- $20 / 3\ N = V_1 / 21\ N$
- $20 / 1 = V_1 / 7$
- $20 = V_1 / 7$
- $V_1 = (7)(20)$
- $V_1 = 140$ Volt

Example 6

- According to figure below, what is the amount of the secondary loops of the transformer.

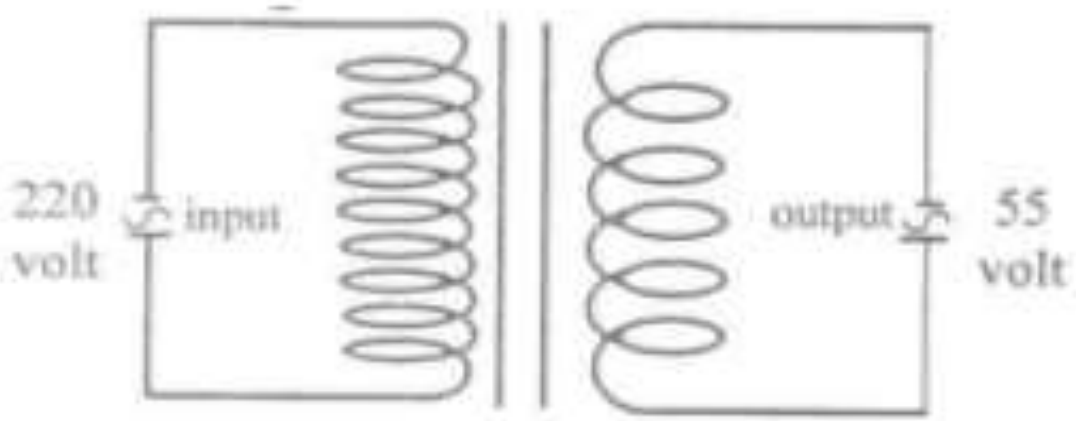


Solution

- $V_s / N_s = V_p / N_p$
- 1100 Volt / N_s = 220 Volt / 200 loops
- 1100 / N_s = 220 / 200
- 1100 / N_s = 1.1
- N_s = 1100 / 1.1
- N_s = 1000 loops

Example 7

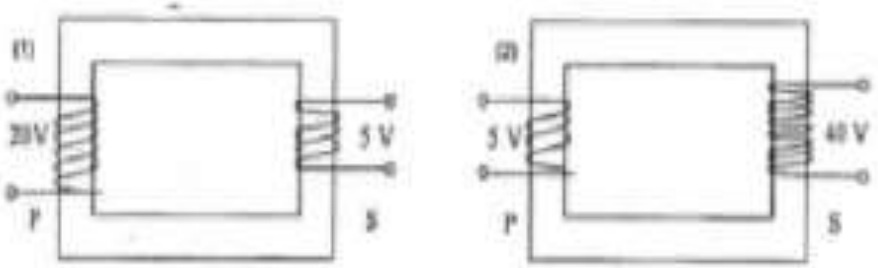
- If the primary coil has 800 loops, then determine the secondary coil.



Solution

- $V_s / N_s = V_p / N_p$
- $55 / N_s = 220 / 800$
- $55 / N_s = 22 / 80$
- $N_S = (80)(55) / 22$
- $N_S = 4400 / 22$
- $N_S = 200$ loops

Quick Quiz 1



Based on the above figure, which of the following statements about the figure above is correct.

A. Figure 1 is a step-up transformer and figure 2 is a step-down transformer

B. Figure 1 is a step-down transformer and figure 2 is a step-up transformer

C. Figure 1 and 2 are a step-down transformer

D. Figure 1 and 2 are a step-up transformer

Quick Quiz 2

Quantities	Transformers	
	P	Q
Primary voltage	110 V	220 V
Secondary voltage	200 V	110 V
Primary current	4 A	1 A
Secondary current	2 A	2 A
Power	400 W	220 W

The correct statement about transformer P and Q is…

A. P is a step-down transformer because of $I_s < I_p$

B. P is a step-up transformer because of $V_p < V_s$

C. Q is a step-up transformer because of $V_p > V_s$

D. Q is a step-up transformer because $I_s > I_p$

Quick Quiz 3

- Turns ratio of the transformer is directly proportional to _____

  a) Resistance ratio
  b) Currents ratio
  c) Voltage ratio
  d) Not proportional to any terms

Quick Quiz 4

- Which of the following statement is correct regarding turns ratio?

  a) Current ratio and turns ratio are inverse of each other
  b) Current ratio is exactly same to the voltage ratio
  c) Currents ratio is exactly same to the turns ratio
  d) Voltage ratio and turns ratio are inverse of each other