

## Transformers

1. A step-down transformer has a turn ratio  $\frac{N_s}{N_p} = \frac{1}{13}$ . What is the voltage on the secondary side if the primary side is attached to a 120 V source? (9.2 V)
2. Insect “zappers,” use a high voltage to electrocute insects. One such device uses an AC voltage of 4320 V, which is obtained from a standard 120 V outlet by means of a transformer. If the primary coil has 21 turns, how many turns are in the secondary coil? (756)
3. Electric doorbells found in many homes require 10 V to operate. A transformer is used to convert standard household 120 V to the 10 V required by the doorbell.
  - (a) Is this a step-up or step-down transformer? (step-down)
  - (b) What is the turns ratio  $\frac{N_s}{N_p}$ ? (1/12)
4. A step-down transformer with a turns ratio  $\frac{N_s}{N_p} = \frac{1}{8}$  is used with an electric train to reduce the voltage from the wall receptacle 120 V to a value needed to operate the train. When the train is running, the current in the secondary coil is 3.4 A. What is the current in the primary coil? (0.425 A)
5. The secondary coil of a step-up transformer provides the voltage that operates an electrostatic air filter. The turns ratio of the transformer is  $\frac{N_s}{N_p} = \frac{43}{1}$ . The primary coil is plugged into a standard 120 V outlet. The current in the secondary coil is 1.5 mA. Calculate the power used by the air filter. (7.7 W)
6. In a television set the power needed to operate the picture tube is 95 W and is derived from the secondary coil of a transformer. There is a current of 5.3 mA in the secondary coil. The primary coil is connected to a 120 V source. Calculate the turns ratio  $\frac{N_s}{N_p}$  of the transformer. (149/1)