Transformers

1. A neon sign requires 12,000 V for its operation. It operates from a 220 V supply.
   a. What type of transformer is needed?
   b. What must be the turns ratio, N_s/N_p of the transformer?

2. What happens to the output voltage when the number of turns on the secondary transformer coil is doubled?

3. A step-up transformer has 110 turns on its primary coil. Its secondary coil consists of 1455 turns. The primary coil received an AC current at 120 V.
   a. What is the voltage across the secondary circuit?
   b. The current in the secondary coil is 3.6 A. What current flows in the primary circuit?
   c. What is the power input and output of the transformer?

4. The primary coil of a transformer has 700 turns and is connected to a 185 V source. How many turns would be needed in the secondary coil to supply 880 V?

5. In some places, insect zappers, with its blue lights, are a familiar sight on a summer's night. These devices use a high voltage to electrocute the insects. One such device uses and AC voltage of 4320 V, which is obtained from a standard 240 V outlet by means of a transformer. If the primary coil has 21 turns, how many turns are there in the secondary coil?

6. A generating station is producing 1.2×10^6 W of power that is to be sent to a small town that is 7 km away. Each of the two wires that comprise thew transmission line has a resistance of 5.0×10^{-2} Ω/km.
   a. Find the power lost in the heating of the wires if the power is transmitted at 1200 V.
   b. A 100:1 step-up transformer is used to raise the voltage before the power is transmitted. How much power is now lost in heating the wires?

Answers
1a. step up b. 600/11   2. Doubled   3a. 1587 V   b. 48A c. 5714 W   4. 3330 turns 5. 378   6a. 700,000W   b 70 W