

31.26 •• In an L - R - C series circuit the source is operated at its resonant angular frequency. At this frequency, the reactance X_C of the capacitor is $200\ \Omega$ and the voltage amplitude across the capacitor is $600\ \text{V}$. The circuit has $R = 300\ \Omega$. What is the voltage amplitude of the source?

31.36 • A Step-Up Transformer. A transformer connected to a 120-V (rms) ac line is to supply $13,000\ \text{V}$ (rms) for a neon sign. To reduce shock hazard, a fuse is to be inserted in the primary circuit; the fuse is to blow when the rms current in the secondary circuit exceeds $8.50\ \text{mA}$. (a) What is the ratio of secondary to primary turns of the transformer? (b) What power must be supplied to the transformer when the rms secondary current is $8.50\ \text{mA}$? (c) What current rating should the fuse in the primary circuit have?

50. A large power plant generates electricity at $12.0\ \text{kV}$. Its old transformer once converted the voltage to $335\ \text{kV}$. The secondary of this transformer is being replaced so that its output can be $750\ \text{kV}$ for more efficient cross-country transmission on upgraded transmission lines. (a) What is the ratio of turns in the new secondary compared with the old secondary? (b) What is the ratio of new current output to old output (at $335\ \text{kV}$) for the same power? (c) If the upgraded transmission lines have the same resistance, what is the ratio of new line power loss to old?

51. If the power output in the previous problem is $1000\ \text{MW}$ and line resistance is $2.00\ \Omega$, what were the old and new line losses?