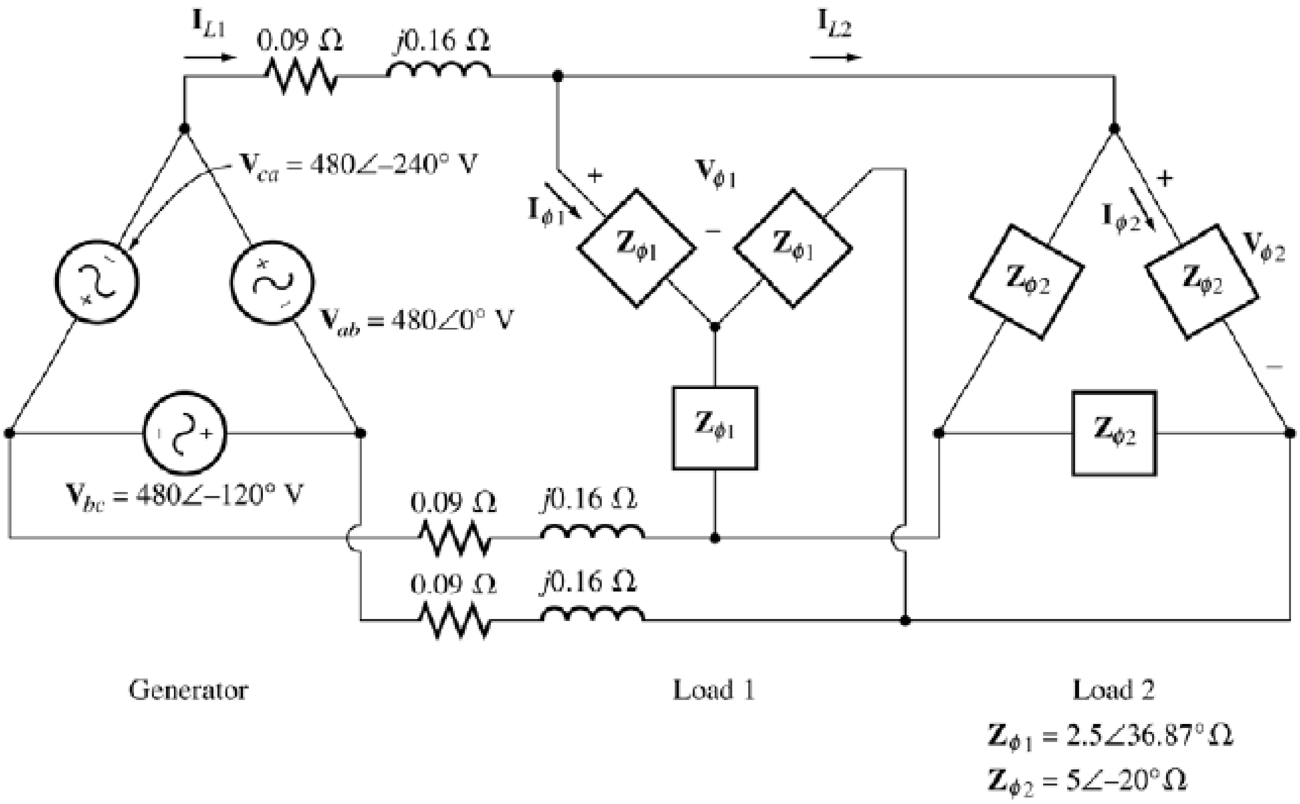
**Q1)**

Figure PA-1 shows a three-phase power system with two loads. The Δ-connected generator is producing a line voltage of 480 V, and the line impedance is $0.09 + j0.16\ \Omega$. Load 1 is Y-connected, with a phase impedance of $2.5\angle 36.87°\ \Omega$ and load 2 is Δ-connected, with a phase impedance of $5\angle -20°\ \Omega$.




*(a)* What is the line voltage of the two loads?

*(b)* What is the voltage drop on the transmission lines?

*(c)* Find the real and reactive powers supplied to each load.

*(d)* Find the real and reactive power losses in the transmission line.

*(e)* Find the real power, reactive power, and power factor supplied by the generator.

**Q2) Textbook Problem 1.5**

**Q3) Textbook Problem 1.7**

**Q4) Textbook Problem 1.8**

**Q5)**

The total core loss for a specimen of magnetic sheet steel is found to be 1800 W at 60 Hz. If the flux density is kept constant and the frequency of the supply increases 50%, the total core loss is found to be 3000 W. Compute the separate hysteresis and eddy-current losses at both frequencies.

**Q6)**

A two-legged magnetic core with an air gap is shown in Figure P1-11. The depth of the core is 5 cm, the length of the air gap in the core is 0.05 cm, and the number of turns on the coil is 1000. The magnetization curve of the core material is shown in Figure P1-9. Assume a 5 percent increase in effective air-gap area to account for fringing. How much current is required to produce an air-gap flux density of 0.5 T? What are the flux densities of the four sides of the core at that current? What is the total flux present in the air gap?

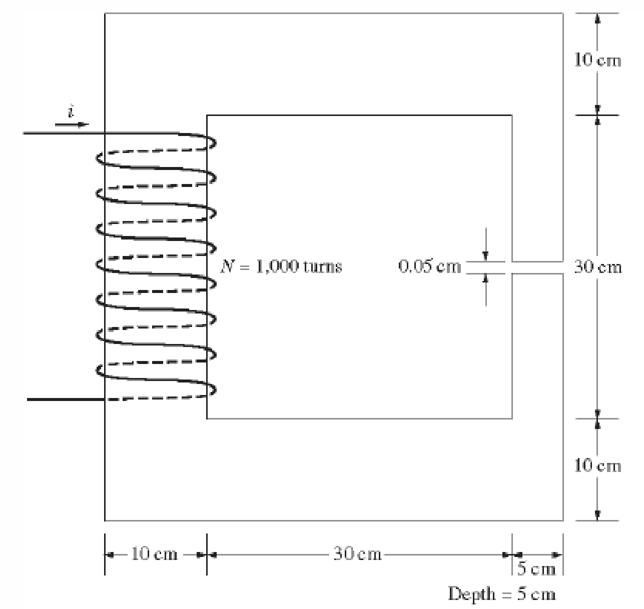



FIGURE P1–11

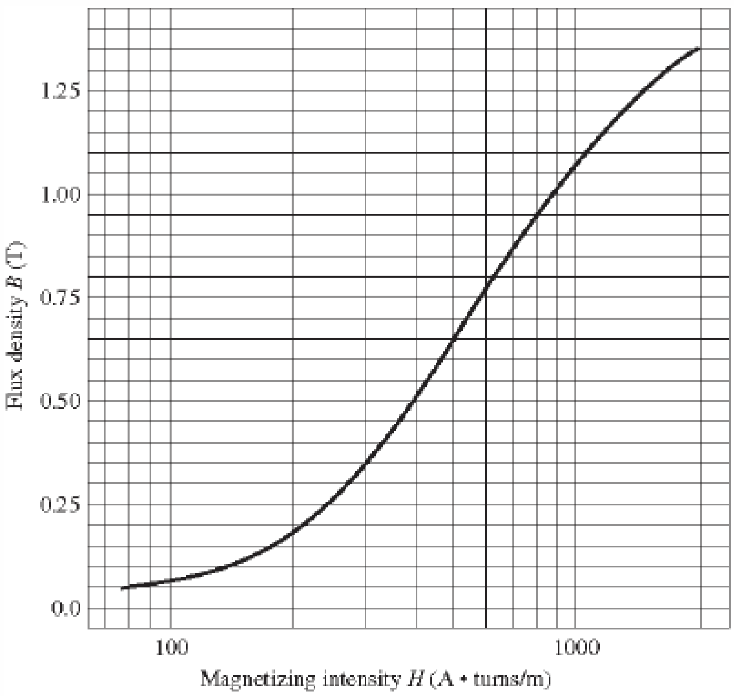



FIGURE P1–9