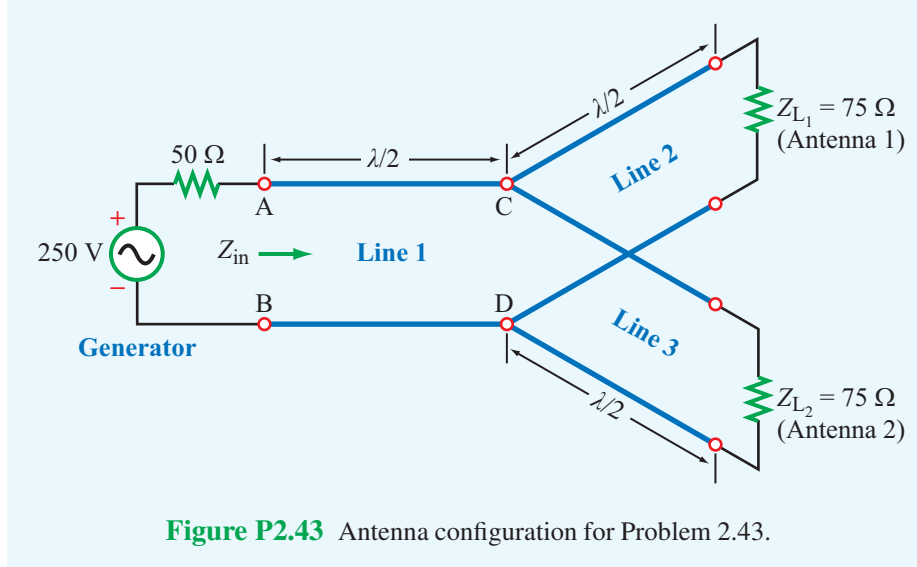


**2.43** If the two-antenna configuration shown in Fig. P2.43 is connected to a generator with  $\tilde{V}_g = 250$  V and  $Z_g = 50$   $\Omega$ , how much average power is delivered to each antenna?



**Solution:** Since line 2 is  $\lambda/2$  in length, the input impedance is the same as  $Z_{L_1} = 75$   $\Omega$ . The same is true for line 3. At junction C–D, we now have two 75- $\Omega$  impedances in parallel, whose combination is  $75/2 = 37.5$   $\Omega$ . Line 1 is  $\lambda/2$  long. Hence at A–C, input impedance of line 1 is 37.5  $\Omega$ , and

$$\tilde{I}_i = \frac{\tilde{V}_g}{Z_g + Z_{in}} = \frac{250}{50 + 37.5} = 2.86 \quad (\text{A}),$$

$$P_{in} = \frac{1}{2} \Re[\tilde{I}_i \tilde{V}_i^*] = \frac{1}{2} \Re[\tilde{I}_i \tilde{I}_i^* \tilde{Z}_{in}^*] = \frac{(2.86)^2 \times 37.5}{2} = 153.37 \quad (\text{W}).$$

This is divided equally between the two antennas. Hence, each antenna receives  $\frac{153.37}{2} = 76.68$  (W).