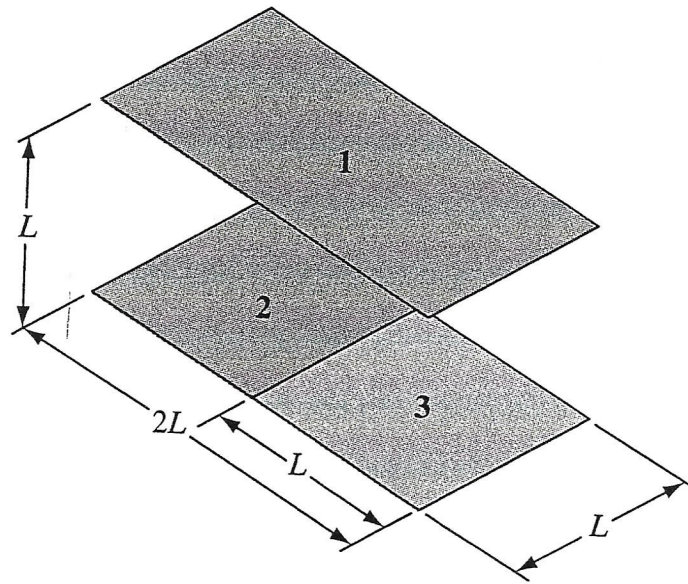


ASSIGNMENT #10

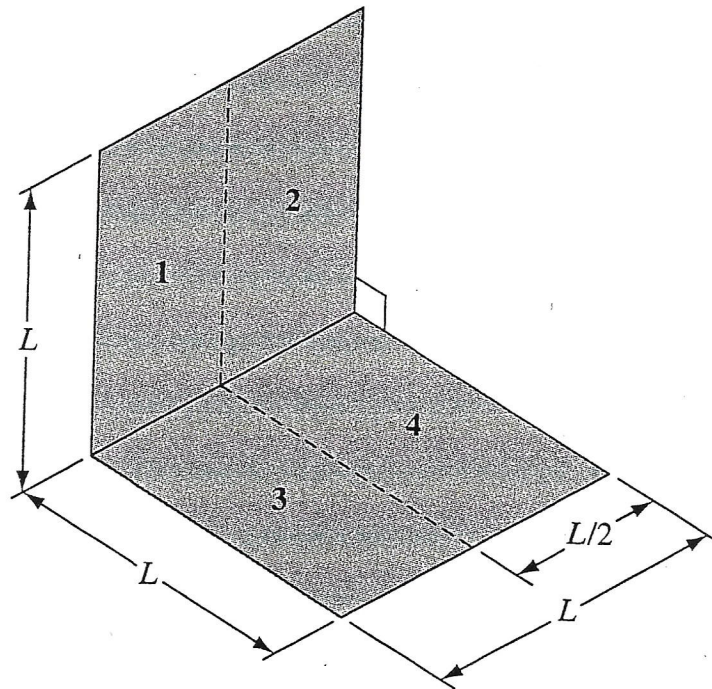
Radiation Concepts

- 10-1 A large body of nonluminous gas at a temperature of 1100°C has emission bands between 2.5 and $3.5\ \mu\text{m}$ and between 5 and $8\ \mu\text{m}$. At 1100°C the effective emissivity in the first band is 0.8 and in the second 0.6 . Determine the emissive power of this gas in W/m^2 .
- 10-2 Determine the shape factor F_{1-2} for the geometrical configuration shown



10-3

Determine the shape factor F_{1-4} for the geometrical configuration shown



10-4

A 4-cm-diameter cylindrical enclosure with black surfaces, as shown in the accompanying sketch, has a 2-cm hole in the top cover. Assuming the walls of the enclosure are all at the same temperature, determine the percentage of the total radiation emitted from the walls that will escape through the hole in the cover.

10-5

In the construction of a space platform, two structural members of equal size with surfaces that can be considered black are placed relative to each other as shown below. Assuming that the left member attached to the platform is at 500 K while the other is at 400 K and that the surroundings can be treated as though black at 0 K, calculate (a) the rate at which the warmer surface must be heated to maintain its temperature, (b) the rate of heat loss from the cooler surface to the surroundings, and (c) the net rate of heat loss to the surroundings for both members.

