Homework

1. A short summary about the conductive heat transfer.

When the heat transfers through the wall, it will be lost, and the loss of heat rate ($\dot{Q}$) is related to the conductivity of the material (K), area of the wall (A), thickness (L) and delta T, which can be calculated by the formula $\dot{Q}$ = kA (delta T)/L, or the formula $\dot{Q}$ = (delta T)/R_{wall}, R_{wall}= L/kA. The heat loss rate ($\dot{Q}$) is inversely proportional to area of the wall (A) and the conductivity of the material (K), and delta T.

2. Solving the same exercise with L=0.4m A=20 ㎡ △T=25℃ K=0.78$\frac{W}{mk}$ using both simple method and using the resistance concept.

By using the simple method:

$\dot{Q}$ = kA $\frac{\triangle T}{L}$ = 0.78 • 20 • $\frac{25}{0.4}$ = 975W

By using the resistance concept:

R_{wall}= $\frac{L}{kA}$ = $\frac{0.4}{0.78 \bullet 20}$ ≈ 0.0256 $℃/W$

$\dot{Q}$ = $\frac{\triangle T}{R_{wall}}$ = $\frac{25}{0.0256}$ ≈ 976.56W