

There are three ways in which heat transfer occurs in nature :conduction ,convection and Radiation. In conductive heat transfer, heat transfers through a medium. It occurs due to the molecular excitement (lattice vibration) within the material without the physical movement of material and the energy is transported by the free electrons. The heat flows in the direction of the decreasing temperatures since temperature and molecular vibrations are directly proportional.

Sum:

Given data-

$$A=20\text{m}^2$$

$$L=0.4\text{m}$$

$$\Delta T= 25$$

$$\text{and } k=0.78\text{W/m k}$$

Solution:

$$R_{\text{wall}}= L/ kA$$

Therefore,

$$R_{\text{wall}}= 0.4/ 0.78 \times 20$$

$$= 0.4/15.6$$

$$=0.0256 \text{ } ^\circ\text{C/W}$$

$$Q= \Delta T/R_{\text{wall}}$$

$$Q=25/0.0256$$

Therefore,

$$Q=976.56\text{W}$$