Task 1:

A short summary about the conductive heat transfer.

Heat transfer takes place as conduction in a solid if there is a temperature gradient.

Conduction as heat transfer takes place if there is a temperature gradient in a solid or stationary fluid medium.

With conduction energy transfers from more energetic to less energetic molecules when neighboring molecules collide. Heat flows in direction of decreasing temperatures since higher temperatures are associated with higher molecular energy.

Conductive heat transfer can be expressed with :

$q = (k / s) A dT$

$= U A dT$ (1)

where

q = heat transfer (W, J/s, Btu/hr)

k = Thermal conductivity (W/m K or W/m °C, Btu/(hr °F ft^2/ft))

s = material thickness (m, ft)

A = heat transfer area (m^2, ft^2)

$U = k / s$

= Coefficient of heat transfer (W/(m^2K), Btu/(ft^2 h °F)

$dT = t_1 - t_2$

= temperature gradient - difference - over the material (°C, °F

Task 2:

solving the same exercise with L=0.4m, A=20m2, delta T=25, and K=0.78 W/mK using both simple method and using the resistance concept

The answer:

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

<u>Another answer:</u>

$$R_{wall} = \frac{L}{kA} = \frac{0.4}{0.78 * 20} = 0.0256\,°C/W$$

$$\dot{Q} = \frac{\Delta T}{R_{Wall}} = \frac{25}{0.0256}$$
$$= 976.5W$$