

G10-1

A = ?

$$\dot{m}_A = 2 \text{ kg/s} \quad t_{Ai} = 65^\circ\text{C} \quad t_{Ae} = 25^\circ\text{C}$$

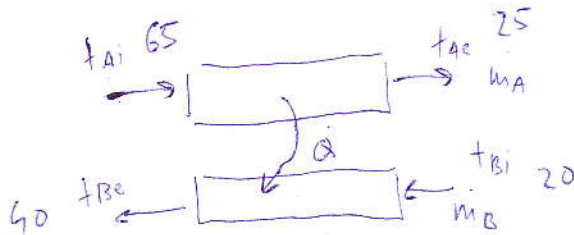
$$t_{Bi} = 20^\circ\text{C} \quad t_{Be} = 40^\circ\text{C}$$

$$k = 180 \text{ W/m}^2\text{K}$$

$$c_{PA} = 2 \cdot 10^3 \text{ J/kgK}$$

$$c_{PB} \left(\frac{20+40}{2} \right) = 4,183 \cdot 10^3 \text{ J/kgK}$$

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$$\dot{m}_A c_{PA} (T_{Ai} - T_{Ae}) = \dot{Q} \quad \rightarrow \quad \dot{Q} = 2 \cdot 2000 \cdot (40) = 160\,000 \text{ J/s.}$$

$$\dot{m}_B c_{PB} (T_{Be} - T_{Bi}) = \dot{Q} \quad \rightarrow \quad \dot{m}_B = \frac{\dot{Q}}{c_{PB} (T_{Be} - T_{Bi})} = \frac{\dot{Q}}{83\,660} = 1,913 \frac{\text{kg}}{\text{s}}$$

$$\dot{m}_B (h_{Be} - h_{Bi}) = \dot{Q}$$

$$\dot{m}_B = \frac{\dot{Q}}{(167,5 - 83,89) \cdot 10^3} = \frac{\dot{Q}}{83\,660}$$

$$\textcircled{B} \quad \Delta T_{LS} = \frac{(65-40) - (25-20)}{\ln \frac{65-40}{25-20}} = \frac{25-5}{\ln \frac{25}{5}} = 12,43 \text{ }^\circ\text{C}$$

$$\dot{Q} = k \cdot A \cdot \Delta T_{LS}$$

$$A = \frac{\dot{Q}}{k \cdot \Delta T_{LS}} = \frac{160\,000}{180 \cdot 12,43} = \underline{\underline{71,51 \text{ m}^2}}$$