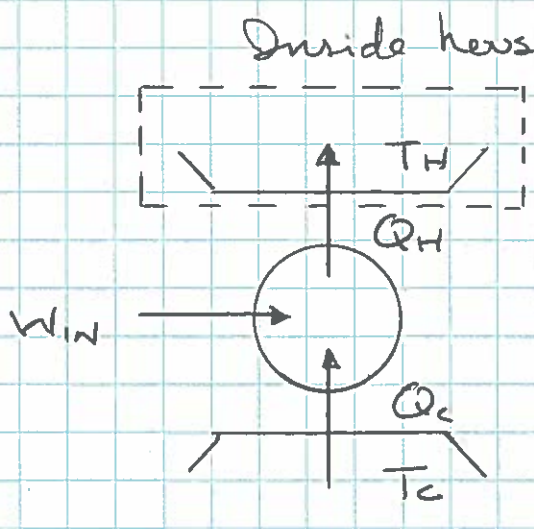
Heat Pump



$K = 5.0$ for heat pump

$K = Q_H / W_{IN}$

a.) For $Q_H = 15\ kJ/s$ delivered to the house.

$$W_{IN} = \frac{Q_H}{K} = 3\ kJ/s$$

b.) For heat pump: $W_{IN} = 3\ kJ/s$ for 250 hr.

where Cost of elec, $C = \frac{40\ MJ}{dollar}$

To run the heat pump for $t = 250\ hr. = 9 \times 10^5\ s$

$$\text{Cost} = \left(3\ \frac{kJ}{s}\right)\left(9 \times 10^5\ s\right)\left(\frac{\$1}{40 \times 10^3\ kJ}\right)$$

$$= \$67.50$$

For a 15 kw electric furnace running for $t = 9 \times 10^5\ s$.

$$\text{Cost} = 15\ \frac{kJ}{s}\left(9 \times 10^5\ s\right)\left(\frac{\$1}{40 \times 10^3\ kJ}\right)$$

$$= \$337.00$$