

$$Q_s + Q_0 = Q_1 + Q_2$$

$$\frac{Q_s}{Q_1} = \frac{T_s}{T_D} \quad \text{and} \quad \frac{Q_0}{Q_2} = \frac{T_0}{T_D}$$

$$Q_s = \left(\frac{T_s}{T_D}\right) Q_1 \quad Q_0 = \left(\frac{T_0}{T_D}\right) Q_2$$

$$\frac{T_s}{T_D} Q_1 + \left(\frac{T_0}{T_D}\right) Q_2 = Q_1 + Q_2 \Rightarrow \left(\frac{T_s}{T_D} - 1\right) Q_1 = \left(1 - \frac{T_0}{T_D}\right) Q_2$$

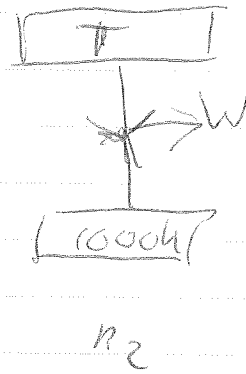
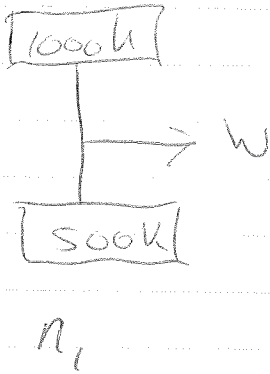
$$\frac{Q_1 + Q_2}{Q_s} = \frac{Q_1 + Q_1 \left[\frac{T_s}{T_D} - 1\right] / \left(1 - \frac{T_0}{T_D}\right)}{Q_s}$$

$$\frac{T_s}{T_D} Q_1$$

$$= \frac{T_D}{T_s} + \frac{T_D}{T_s} \left[\frac{\frac{T_s}{T_D} - 1}{1 - \frac{T_0}{T_D}} \right] = \frac{T_D}{T_s} + \frac{1 - \frac{T_0}{T_D}}{1 - \frac{T_0}{T_D}}$$

$$= \frac{T_D}{T_s} + T_D -$$

5.24)



$$\eta_1 = \eta_2 \quad \eta_1 = 1 - \frac{T_c}{T_h} = 1 - \frac{1}{2} = 50\%$$

$$\eta_2 = 50\% \quad 1 - \frac{T}{1000} \quad T = 2000 \text{ K}$$

5.26) $\eta = 1 - \frac{T_c}{T_h} = 1 - \frac{350}{800} = 0,56 \quad 56\%$

5.36) cycle op theoretisch randonomet niet logisch!

a) $1 - \frac{T_c}{T_h} = 1 - \frac{300}{1200} = 75\%$

b) $\frac{W_c}{Q_{in}} = 1 - \frac{T_c}{T_h}$

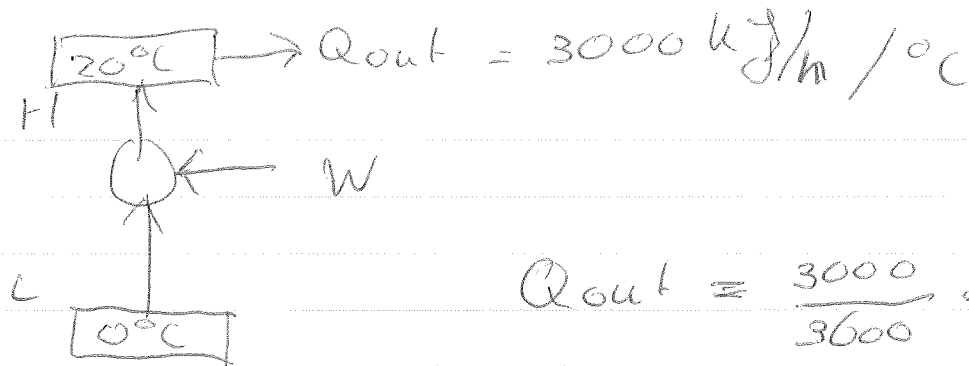
$$Q_{in} = \frac{W_c}{1 - \frac{T_c}{T_h}} = \frac{1000}{1 - \frac{293}{773}} = 1610 \text{ kJ}$$

$$W = Q_{out} - Q_{in} \quad ; \quad Q_{out} = 610 \text{ kJ}$$

c) —

d) $\eta = 1 - \frac{T_c}{T_h} = 0,4 \quad ; \quad 0,4 = 1 - \frac{T_c}{1000 \text{ K}} \quad T_c = 600 \text{ K}$

5.4)



$$Q_{out} = \frac{3000}{3600} \cdot 20 = 16.7 \text{ kW}$$

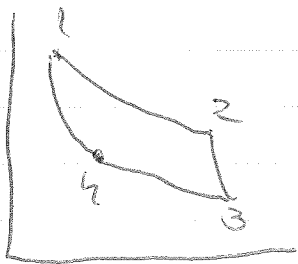
~~$$\frac{Q_H}{Q_L} = \frac{T_H}{T_L} =$$~~

$$Q_L = \frac{Q_H T_L}{T_H} = 16.7 \cdot \frac{273}{293}$$

$$Q_L = 15.6 \text{ kW}$$

$$W = 16.7 - 15.6 = \underline{1.1 \text{ kW}}$$

5.4)



$$V_4 V_2 = V_1 V_3 = ?$$

$$\frac{T_2}{T_3} = \left(\frac{P_2}{P_3} \right)^{\frac{k-1}{k}}$$

$$\frac{T_2}{T_3} = \left(\frac{V_3}{V_2} \right)^{k-1}$$

2 → 3 adiabatic

$$Q=0 \quad PV^k = \text{const}$$

$$\frac{mRT}{V} V^k = \text{const} \Rightarrow TV^{k-1} = \text{const}$$

$$T \left(\frac{mRT}{P} \right)^{k-1} = \text{const}$$

$$= T^k / P^{k-1} = \text{const}$$

$$T^k \cdot P^{1-k} = \text{const} \Rightarrow TP^{\frac{1-k}{k}} = \text{const}$$

let op

de 2 en 3
boven en onder
de noemer