

naam
name Boersma

studienummer
student number

vak
course

code
code

datum
date

opleiding
program

aantal ingeleverde vellen
total number of sheets

opgave nummer
question number

1 2 3 4 5 6 7 8 9 10 11 12 13 14
~~1 2 3 4 5 6 7 8 9 10 11 12 13 14~~ a b c c d a a c b a c a a d.

$$1) a \quad Q = W - m(h_1 - h_2 + \frac{V_1^2}{2} - \frac{V_2^2}{2} + g z_2 - g z_1)$$

$$b) s_1 = s_2 \quad s_1 \text{ tabel } 300^\circ\text{C} = \frac{6.6828 + 6.8452}{2} = 6.764$$

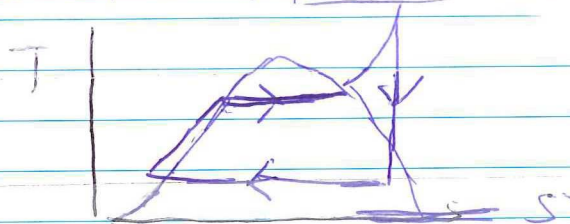
$$x = \frac{(s_2 - s_f)(s_g - s_f)}{s_g - s_f} = \frac{6.764 - 0.4226}{8.4746 - 0.4226} = 0.788$$

$$c \quad W = m(h_1 - h_2) =$$

$$h_1 = \text{tabel} + \text{interpoleren} = 3023 \text{ kJ/kg}$$

$$h_2 = h_f + x(h_g - h_f) = 2038.6 \text{ kJ/kg}$$

$$W = 50 \Delta h = 49.2 \text{ MW}$$



$$e) \quad \left. \begin{array}{l} h_3 \text{ (verzadigd)} = 121.5 \text{ kJ/kg} \\ h_4 = 123.5 \end{array} \right\} \begin{array}{l} W_{\text{pomp}} = \\ m \Delta h \\ = -0.1 \text{ MW} \end{array}$$

$$Q = m(h_5 - h_4) = 50(3023 - 123.5) = 145 \text{ MW}$$

$$\eta = \frac{\Sigma W}{Q_{in}} = \frac{49.2 - 0.1}{145} = 34\%$$

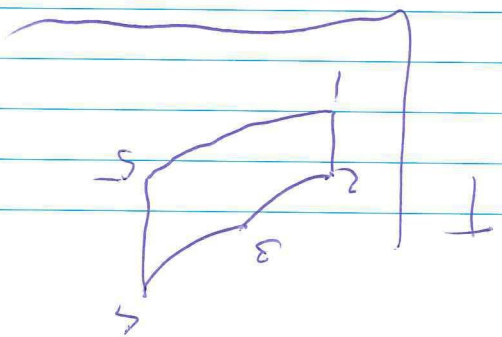
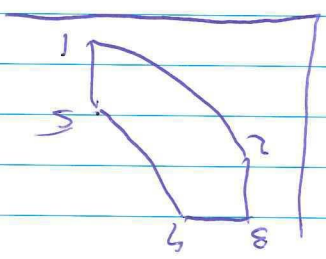
$$f) \quad Q_{\text{condensator}} = \underset{\text{cyc}}{m \Delta h} = 50(2038.6 - 121.5) = 95.8 \text{ MW}$$

controle $((145 - 49.2 + 0.1) \approx 95.8 \text{ MW})$

$$\dot{m}_{\text{condensator}} c_p \Delta T = Q_{\text{condensator}}$$

$$\dot{m}_{\text{condensator}} = \frac{95.8 \cdot 10^6}{4180 \cdot 8} = 2864 \text{ kg/s}$$

2



$k = \frac{c_p}{c_v} = 1.4$

b

$$v_2 = \frac{v_1}{\sqrt{2}} = \frac{v_1}{1.414}$$

$$v_2 = 738$$

$$v_2 = 738/g = 82$$

$$T_2 = 660 K$$

$$p v^k = c \quad p = \frac{p_1}{v^k}$$

$$T v^{k-1} = c \Rightarrow T_2 = T_1 \left(\frac{v_1}{v_2}\right)^{k-1} = 280 \cdot 1.4 = 674 K$$

$$T_3 = 1.8 T_2 = 1213 K \quad T_3 = T_4 \Rightarrow T_4 = 1820 K$$

$$T_5 = T_4 \left(\frac{v_4}{v_5}\right)^{\gamma} = T_4 \left(\frac{v_4}{v_3}\right)^{\gamma} = 1.4 T_4 \left(\frac{v_4}{v_3}\right)^{\gamma}$$

$$T_5 = \rho \rho g$$

d

$$Q_{12}/m = 0 \quad Q_{23}/m = c_p (T_3 - T_2) = 394 KJ/kg$$

$$Q_{34}/m = c_v (T_4 - T_3) = 133 KJ/kg$$

$$Q_{45}/m = 0 \quad Q_{51}/m = 0$$

$$Q_{23}/m = c_v (T_3 - T_2) = 385 KJ/kg$$

$$Q_{34}/m = c_p (T_4 - T_3) = 607 KJ/kg$$

$$Q_{45}/m = 0 \quad Q_{51}/m = c_v (T_5 - T_1) = 435 KJ/kg$$

$$\dot{W} = \dot{Q}_{in} - \dot{Q}_{out} = 385 + 607 - 435 = 557 W/kg$$

$$\eta = \frac{557}{385 + 607} = 56\%$$

$$\text{Vermogen} = \dot{W} = 557$$

verbruik

f
3000 Tprn = 50 om/s

$$m = \frac{80 \cdot 25}{557} = 0.006 \text{ kg/s (0,006 kg/s)}$$

$$v_1 = \frac{p}{\rho} = 4.46$$

Rotor

als je de 2

van vortendit versgole
beest vast dat geen punt