

$$1) \text{ a) } T_{KF, \text{in}} = 288,15 \text{ K}$$

$$T_{KF, \text{aus}} = 298,15 \text{ K}$$

$$P_{KF, \text{in}} = P_{KF, \text{aus}} \rightarrow \text{isobar}$$

Energiebilanz

$$\dot{Q} = \dot{m}_{\text{in}} (h_{\text{in}} - h_{\text{aus}}) + \dot{Q}_F - \dot{Q}_R \quad \text{siedende Flüssigkeit (Vaus)}^0$$

$$\dot{Q}_R - \dot{Q}_F = \dot{Q}_{\text{aus}}$$

$$\dot{m}_{\text{in}} = 0,3 \frac{\text{kg}}{\text{s}}$$

$$x_{\text{in}} = ?$$

$$T_{\text{in}} = 70^\circ\text{C}$$

$$x_{\text{aus}} = ? \rightarrow x_{\text{aus}} = x_D = 0,005$$

$$T_{\text{aus}} = 100^\circ\text{C}$$

$$\rightarrow h_{\text{aus}} = h_f(100^\circ\text{C}) + 0,005(h_g(100^\circ\text{C}) - h_f(100^\circ\text{C}))$$

$$= 419,04 + 0,005(2257,0)$$

$$= 430,325 \frac{\text{kJ}}{\text{kg}}$$

$$h_{\text{in}} = h_f(70^\circ\text{C}) + x_{\text{in}} (h_g(70^\circ\text{C}) - h_f(70^\circ\text{C}))$$

$$= 292,98 + x_{\text{in}} (2333,8)$$

$$\dot{Q}_F = \dot{m}_{\text{in}} (h_{\text{aus}} - h_{\text{in}})$$

$$= 0,3(430,325 - 292,98) = 37,7 \frac{\text{kJ}}{\text{s}}$$

$$\text{wenn } x_{\text{in}} = x_D \rightarrow h_{\text{in}} = 304,649 \frac{\text{kJ}}{\text{kg}}$$

$$\dot{Q}_R - \dot{Q}_F = \dot{Q}_{\text{aus}}$$

$$\dot{Q}_{\text{aus}} = 100 \text{ kW} - 37,7 \text{ kW} = \underline{\underline{63,297 \text{ kW}}}$$

$$\text{b) } \dot{m}_{KF} = ?$$

$$\dot{Q} = \dot{m}_{KF} (h_2 - h_1) + \dot{Q}_{\text{aus}}$$

$$\frac{\dot{Q}_{\text{aus}}}{(h_2 - h_1)} = \dot{m}_{KF}$$

$$\frac{\dot{Q}_{\text{aus}}}{S_C \cdot \dot{c}_{\text{if}}(T_1) dT + v \cdot \dot{f}(p_2 - p_1)} = \dot{m}_{KF} \Rightarrow \frac{63,3 \text{ kW}}{c_{\text{if}}(298,15 - 288,15)} = \dot{m}_{KF}$$

$$6,33 \frac{\text{kW}}{\text{K}} = \dot{m}_{KF} \cdot c_{\text{if}}$$

$$1b) \bar{T} = \frac{\int_e^a T ds}{s_a - s_e} = \frac{h_a - h_e}{s_a - s_e} = \frac{\dot{Q}_{aus}}{\dot{m}_{KF} \cdot c_{if}} = \frac{63,3 \text{ kJ}}{6,33 \frac{\text{kg}}{\text{K}}} \cdot c_{if}$$

$$\frac{c_{if} \ln\left(\frac{T_{aus}}{T_{an}}\right)}{6,33 \frac{\text{kg}}{\text{K}}}$$

$$\rightarrow \frac{10 \text{ K}}{\ln\left(\frac{288,15 \text{ K}}{293,12 \text{ K}}\right)} = \underline{\underline{293,12 \text{ K}}}$$

$$1c) O = \dot{m}_{KF} (s_e - s_a) + \frac{\dot{Q}_{aus}}{\bar{T}} + \dot{s}_{rec}$$

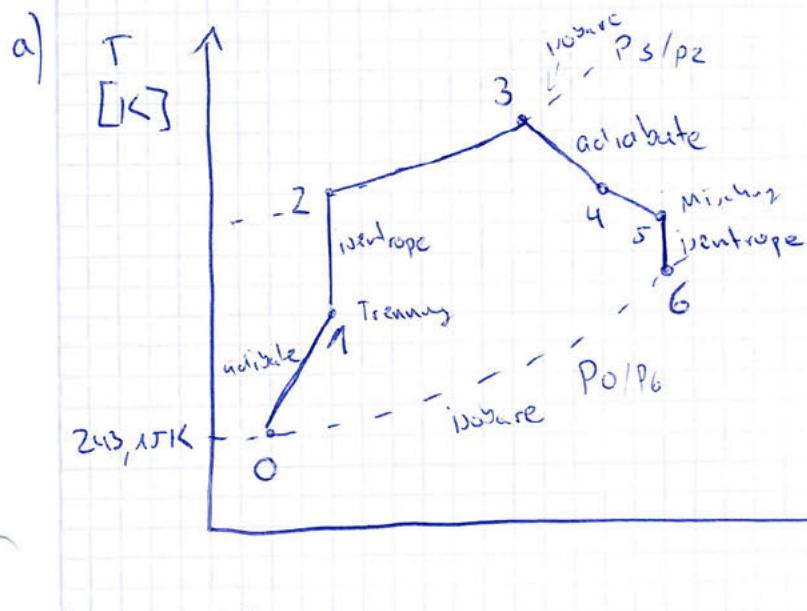
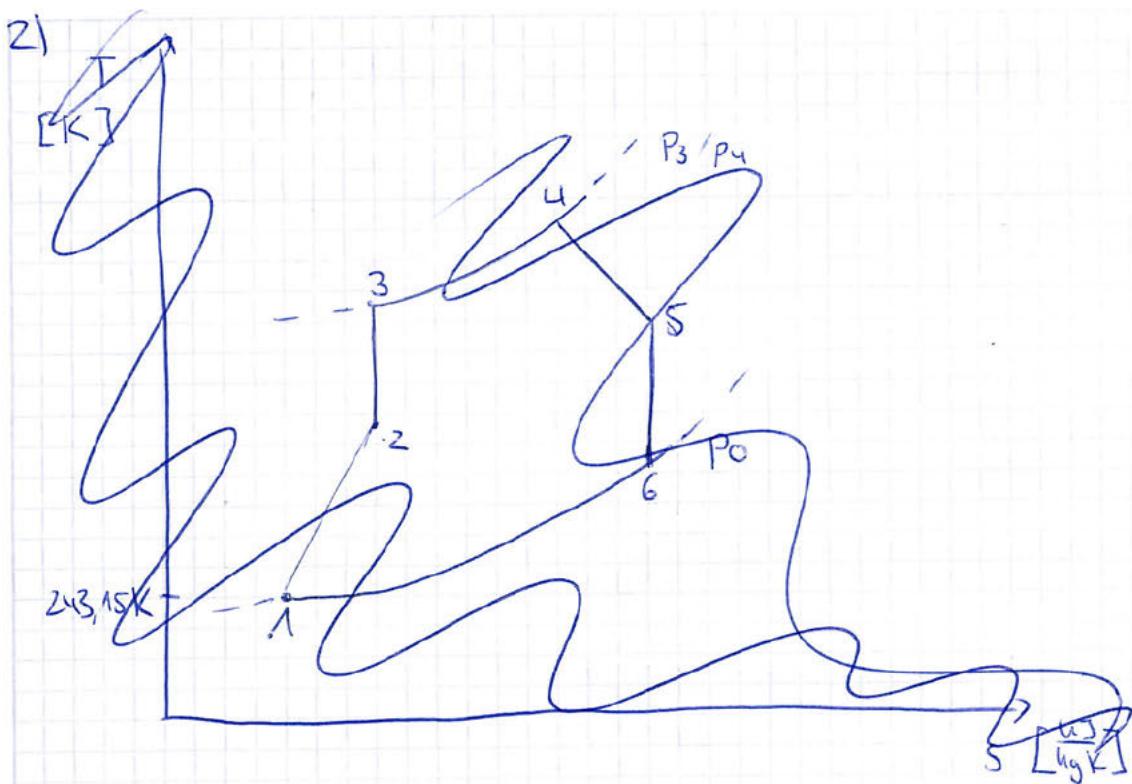
$$\Rightarrow \cancel{O = 6,33 \frac{\text{kJ}}{\text{K}} \cdot c_{if} (\cancel{293,12 \text{ K}})}$$

$$O = 6,33 \frac{\text{kJ}}{\text{K}} \cdot c_{if} \left( \ln\left(\frac{T_{aus}}{T_{an}}\right) \right) + \frac{0,33 \text{ kJ}}{293,12 \text{ K}} + \dot{s}_{rec}$$

$$O = 6,33 \frac{\text{kJ}}{\text{K}} \cdot \ln\left(\frac{288,15 \text{ K}}{293,12 \text{ K}}\right) + \frac{0,33 \text{ kJ}}{293,12 \text{ K}} + \dot{s}_{rec}$$

$$\rightarrow \dot{s}_{rec} = 0 \quad \text{dahin Druckabfall}$$

$$1d) m_2 u_2 - m_1 u_1 = \Delta m (h_{12}) + Q_{R,12}$$



$$b) T_5 = 431,9 \text{ K}$$

$$P_5 = 0,15 \text{ bar}$$

$$w_5 = 220 \frac{\text{m}}{\text{s}}$$

isentrop 5-6 :  $n = k = 1,4$

$$\frac{T_6}{T_5} = \left( \frac{P_6}{P_5} \right)^{\frac{n-1}{n}}$$

$$\rightarrow T_6 = T_5 \left( \frac{P_6}{P_5} \right)^{\frac{0,4}{1,4}}$$

$$\Rightarrow T_6 = 431,9 \text{ K} \left( \frac{0,191 \text{ bar}}{0,15 \text{ bar}} \right)^{\frac{0,4}{1,4}}$$

$$0 = m_{\text{gas}} \left( (h_5 - h_6) + \frac{w_5^2 - w_6^2}{2} \right) + \cancel{Q} - \cancel{W_{\text{in}}} \quad \text{adiabat} = 0$$

$$\downarrow h_6 - h_5 = \frac{w_5^2 - w_6^2}{2}$$

$$c_p(T_0 - T_5) = \frac{w_5^2 - w_6^2}{2}$$

$$\rightarrow w_6 = \underline{\underline{507,24 \frac{\text{m}}{\text{s}}}}$$

$$\underline{\underline{= 328,075 \text{ K}}}$$

mit  $c_p = 1,006 \frac{\text{kJ}}{\text{kgK}}$

$$T_6 = 328,075 \text{ K}$$

$$T_5 = 431,9 \text{ K}$$

$$w_5 = 220 \frac{\text{m}}{\text{s}}$$

$$\begin{aligned}
 2C) \dot{m}_{\text{ex}} \cdot \Delta e_{\text{ex, ist,r}} &= \dot{m}_{\text{ex}} \left( h_0 - h_0 - T_0 (s_0 - s_{\text{ex}}) + \frac{w_0^2 - w_0^2}{2} \right) \\
 &= \dot{m}_{\text{ex}} \left( c_p^{\text{is}} (T_0 - T_0) - T_0 (c_p^{\text{is}} (\ln(\frac{T_0}{T_0})) + \frac{w_0^2 - w_0^2}{2}) \right) \\
 &= \dot{m}_{\text{ex}} \left( 1006 \frac{\text{J}}{\text{kgK}} (328,075 - 243,15) - 243,15 \frac{\text{J}}{\text{kgK}} (1006 \frac{\text{J}}{\text{kgK}} (\ln(\frac{328,075}{243,15})) \right. \\
 &\quad \left. + \frac{(507,24)^2 - (2005)^2}{2} \right) \\
 &= \dot{m}_{\text{ex}} (120,73 \frac{\text{kJ}}{\text{kg}}) \\
 \rightarrow \Delta e_{\text{ex, ist,r}} &= 120,73 \frac{\text{kJ}}{\text{kg}}
 \end{aligned}$$

2d)

$$\begin{aligned}
 \dot{Q} &= \Delta e_{\text{ex, str}} + \cancel{\dot{E}_x Q} \xrightarrow{\text{adiabat}} -\dot{W}_t - \cancel{\dot{E}_x \text{ verl}} \\
 \dot{Q} &= \Delta e_{\text{ex, str}} + \cancel{\dot{e}_{\text{ex}} Q} \xrightarrow{\text{adktion Turbine zu Verdichter}} -\dot{W}_t - \Delta e_{\text{ex, verl}} \\
 \dot{e}_{\text{ex}} Q &= \left( 1 - \frac{T_2}{T_B} \right) \cdot q_B = \left( 1 - \frac{288,02 \text{K}}{1289 \text{K}} \right) 1195 \frac{\text{kJ}}{\text{kg}}
 \end{aligned}$$

$$\Delta e_{\text{ex, verl}} = \Delta e_{\text{ex, str}} + \Delta e_{\text{ex}} Q$$

3)

$$\begin{aligned}
 p_{g1} &= p_{amb} + p_{kuben} + p_{EW} \\
 &= 1 \text{ bar} + \frac{(32 \text{ kg} + 0,1 \text{ kg}) \cdot (0,05 \text{ m})^2 \cdot \pi}{(0,05 \text{ m})^2 \cdot \pi} \\
 &= 1 \text{ bar} + \frac{(32 \text{ kg} + 0,1 \text{ kg}) \cdot 9,81 \frac{\text{m}}{\text{s}^2}}{(0,05 \text{ m})^2} \\
 &= \underline{\underline{1,4 \text{ bar}}}
 \end{aligned}$$

$$V_{g1} = 3,14 \text{ L} = 0,00314 \text{ m}^3$$

$$R = \frac{\overline{R}}{M} = \frac{8,314 \frac{\text{kJ}}{\text{mol K}}}{0,028 \frac{\text{kg}}{\text{mol}}} = 0,16628 \frac{\text{kJ}}{\text{kg K}} \quad T_{g1} = 500^\circ\text{C} = 773,15 \text{ K}$$

$$\frac{p_{g1} \cdot V_{g1}}{R \cdot T_{g1}} = m_{g1} = \underline{\underline{3,42 \text{ g}}}$$

b) die Temperatur  $T_{g2}$  ist  $= 0^\circ\text{C}$  da das Eis Wasser eine Temperatur von  $0^\circ\text{C}$  hat und sich Gas & EW in thermodynamische Gleichung befinden.  
 (da Eis noch ruhigsteht)

Da das Gewicht von oben (Kolben, Eis, Atmosphärendruck) immer noch gleich ist  $\rightarrow$  ist der Druck  $p_{Zg} = p_{1g} = 1,4 \text{ bar}$ .

c)  $\Delta E = E_2 - E_1 = m_{g1} \cdot u_2 - m_{g1} \cdot u_1 = Q - W_V$

$$T_{g2} = 0^\circ\text{C} \quad u_2 - u_1 = c_V p_g (T_2 - T_1) = 316,5 \frac{\text{kJ}}{\text{kg}}$$

$$T_{g1} = 500^\circ\text{C}$$

$$\begin{aligned}
 \frac{W_V}{m} &= \frac{R(T_2 - T_1)}{1-n} && \text{reibungsfrei} \rightarrow \text{isentrop} \\
 &= \frac{0,16628(500)}{1-1,263} = -316,5 \frac{\text{kJ}}{\text{kg}} && \rightarrow n = \frac{R+c_V}{c_V} = 1,263
 \end{aligned}$$

es ergibt 346 J

3d)

$$\Delta E = (u_2 - u_1) m = Q_{12} - \cancel{y v} \quad \text{Volumen ändert nicht}$$

$$Q_{12} = 1,5 \text{ kJ}$$

$$u_1 = u_{\text{fr}}(0^\circ\text{C}) + 0,6 (u_{\text{fe}}(0^\circ\text{C}) - u_{\text{fr}}(0^\circ\text{C}))$$

$$= -0,005 + 0,6 (-333,448 + 0,005)$$

$$= -200,093 \text{ J}$$

kg

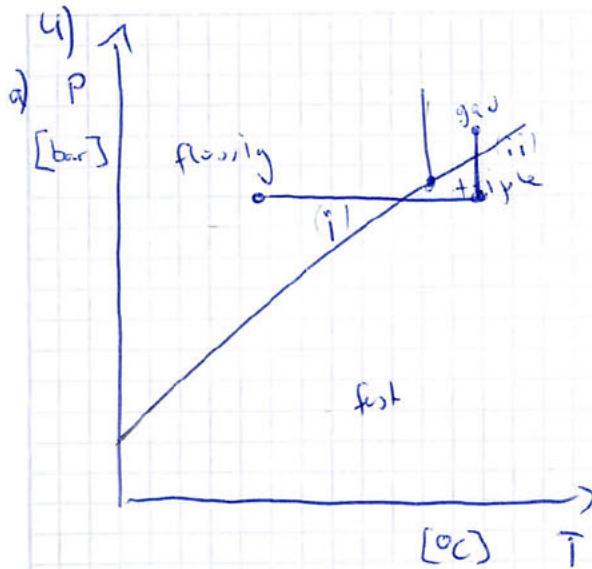
$$u_2 = \frac{Q_{12}}{m} + u_1 = \frac{1,5 \text{ kJ}}{0,1 \text{ kg}} + -200,093 \text{ J} = -185,093$$

$$T_{g2} = 0,003^\circ\text{C}$$

$$u_2 = -185,093 = u_{\text{fr}}(0,003^\circ\text{C}) + x_2 (u_{\text{fe}}(0,003^\circ\text{C}) - u_{\text{fr}}(0,003^\circ\text{C}))$$

$$= -0,0033 + x_2 (-333,442 + 0,0033)$$

$$\rightarrow x_2 = 0,5551 = \underline{\underline{0,555}}$$



b)  $\Delta$

$$0 = m(h_2 - h_1) + \overset{\text{adiabat}}{Q} - \dot{w}_k$$

$$0 = m(h_2 - h_3) - \dot{w}_k$$

$$\frac{\dot{w}_k}{h_2 - h_3} = m$$

$$h_2 = h_f\left(\frac{T_2}{p_{12}}\right) = 259,405 \frac{\text{kJ}}{\text{kg}}$$

$$h_3 = h_f(8 \text{ bar}) = 93,42 \frac{\text{kJ}}{\text{kg}}$$

$$p_1 = p_2$$

$$p_3 = 8 \text{ bar}$$

$$x_2 = 1$$

$$T_2 = T_1 - 6 \text{ K} = 22^\circ \text{C}$$

$$h_g(22^\circ \text{C}) = \frac{260,45 - 258,36}{201 - 20} \cdot (22 - 20) + 258,36 = 259,405 \frac{\text{kJ}}{\text{kg}}$$

c)  $h_4 = h_1$  da iuntunip  $\rightarrow$  uniaxiale Druck

$$x_4 = 0$$

$$p_4 = p_3 = 8 \text{ bar}$$

$$h_4 = h_1 = h_f(8 \text{ bar}) = 93,42 \frac{\text{kJ}}{\text{kg}}$$

$$h_1 = h_f(p_1) + x_1(h_g(p_1) - h_f(p_1))$$

$\rightarrow x_1$

$$T_2 = -22^\circ \text{C}$$

and the public sector, and the implications for the public sector. The first section, "The Public Sector," discusses the role of the public sector in the health care system and the challenges it faces. The second section, "The Private Sector," discusses the role of the private sector in the health care system and the challenges it faces. The third section, "Conclusion," concludes the paper.

## The Public Sector

The public sector plays a significant role in the health care system, providing services such as health care delivery, research, and regulation.

The public sector is responsible for providing health care services to the most vulnerable members of society, such as the poor, the elderly, and the disabled.

The public sector is also responsible for conducting research to improve the quality of health care services and for regulating the health care industry to ensure that it operates fairly and transparently.

The public sector is facing significant challenges, including the need to provide more efficient and effective services, the need to address the growing demand for health care services, and the need to ensure that all members of society have access to high-quality health care services.

The public sector is also facing challenges related to the cost of providing health care services, the need to manage resources effectively, and the need to ensure that all members of society have access to high-quality health care services.

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