② 3 rashladne petlje

$P_j = 3\ GW$

$m_{UO_2} = 80t$

$\phi = 3 \cdot 10^{13}\ n/cm^2s$

$\sigma = 580 \cdot 10^{-28}\ m^2$

$\dot{m}_p = 5000\ kg/s$

$c_v = 5.7\ kJ/kgK$

$\rho = 720\ kg/m^3$

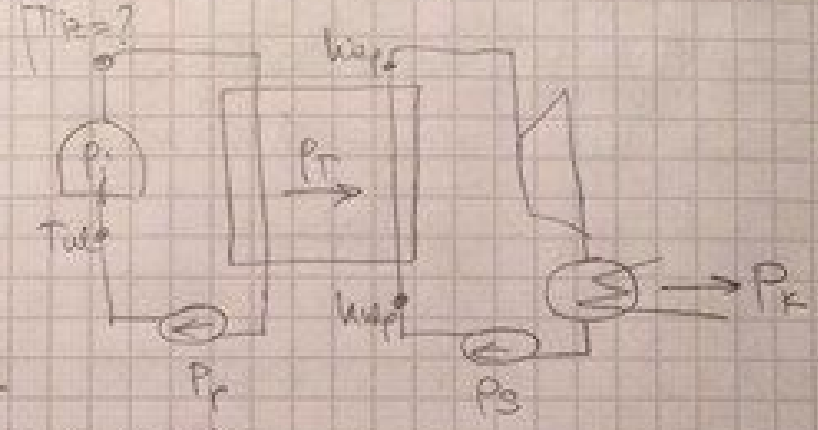
$T_{ul} = 295°C$

$h_{ul} = 931\ kJ/kg$

$h_{iz} = 2964\ kJ/kg$

$\dot{m}_s = 1263\ kg/s$

$e, T_{iz}, P_p, \Delta p_p = ?$



$P_j = \sigma \cdot \phi \cdot N_{235} \cdot 200 \cdot 1.6 \cdot 10^{-13}$

$N_{235} = 5.388 \cdot 10^{27} = e \cdot m_{UO_2} \cdot \frac{238}{270} \cdot \frac{N_A}{235} \rightarrow e = 0,0298$

$P_j = \dot{m} \cdot c_v \Delta T \rightarrow \Delta T = \frac{P_j}{3 \cdot 5000 \cdot 5700} = 35.09\ K$

$T_{iz} = 330°C\ (603K)$

$P_T = \dot{m}_s \Delta h = P_j + 3P_p = 3011,30\ MW$

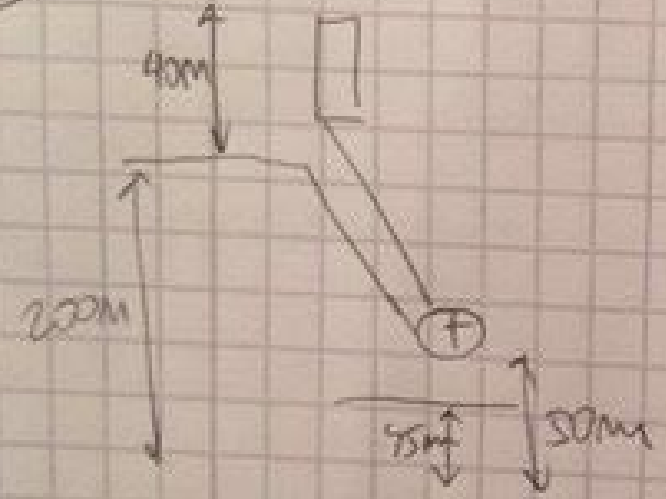
$P_p = 3,78\ MW$

$P_p = \dot{m} w_p = \dot{m} \cdot v \cdot \Delta p_p = \dot{m} \cdot \frac{1}{\rho} \cdot \Delta p \Rightarrow \Delta p_p = 544,2\ kPa$

$P_p = 3{,}78$ MW

$P_p = \dot{m} \cdot W_p = \dot{m} \cdot V \cdot \Delta p_p = \dot{m} \cdot \frac{1}{\rho} \cdot \Delta p \Rightarrow \Delta p_p = 544{,}2\ kPa$

③.



$H_z = 200m$ $H_B = 40m$ $m = 0{,}7$

$H_T = 90m$ $H_{DV} = 45m$

$Q = 150 m^3/s$ $\eta = 0{,}85$

$D_t = 3m$ $D_D = 5m$

$p_A, p_D, w_A, w_D = ?$

$P = 3 \cdot \rho \cdot H_n \cdot \eta Q$

$H_A = H_z + H_B - H_t - \frac{c_A^2}{2g}$

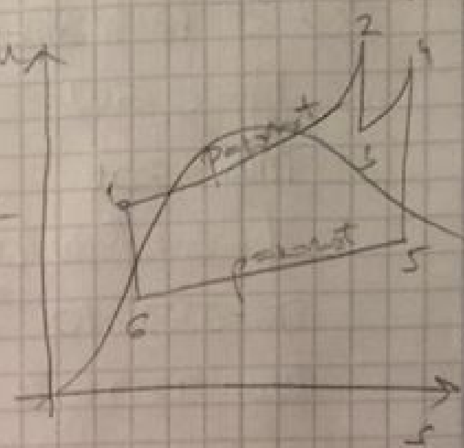
$c_A = \frac{Q}{A_t} = \frac{Q}{\left(\frac{D_t}{2}\right)^2 \cdot \pi}$

$H_D = H_z + H_B - H_{DV} - \frac{c_D^2}{2g}$

$c_D = \frac{Q}{A_D} = \frac{Q}{\left(\frac{D_D}{2}\right)^2 \pi}$

16.6.2016.

Auditorne - vježba za ZI



1. $p_1 = p_2 = 9\,MPa$ $\quad \vartheta_2 = 500°C \rightarrow T_2 = 773{,}15\,K$

$p_3 = p_4 = 0.9\,MPa$ $\quad \vartheta_4 = 450°C \rightarrow T_4 = 723{,}15\,K$

$p_5 = p_6 = 10\,kPa$ $\quad \rho = 10^3\,kg/m^3$

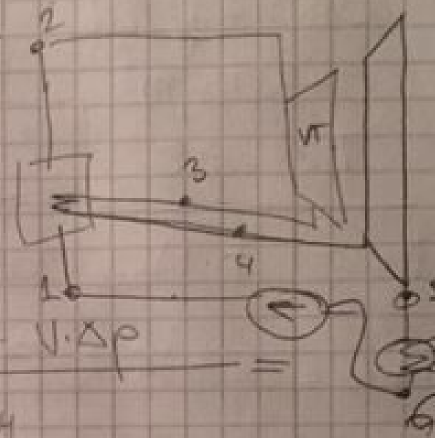
$h_2 = 3411\,kJ/kg$ $\quad \dot{m} = 300\,kg/s$

$h_3 = 2856\,kJ/kg$ $\quad \dot{m}_{HV} = 25\,000\,kg/s$

$h_4 = 3372\,kJ/kg$ $\quad \eta_t, \Delta T_{HV} = ?$

$h_5 = 2431\,kJ/kg$

$h_6 = 192\,kJ/kg$



$$\eta_t = \frac{w}{q_{dov}} = \frac{w_{VT} + w_{NT} - w_p}{q_{dov1} + q_{dov2}} = \frac{w_{23} + w_{45} - v \cdot \Delta p}{q_{12} + q_{34}} =$$

$$= \frac{h_2 - h_3 + h_4 - h_5 - v(p_1 - p_6)}{h_2 - h_1 + h_4 - h_3} - \left[v = \frac{1}{\rho}\right] = 0.3894$$

$w_p = h_1 - h_6$

$v \cdot \Delta p = h_1 - h_6 \rightarrow h_1 = \Delta p \cdot v + h_6$

$$\dot{m}_{HV} \cdot c_v \cdot \Delta T = \dot{m} \Delta h_{kond}$$

$$\Delta T = \frac{\dot{m} \cdot \Delta h_{kond}}{c_v \cdot \dot{m}_{HV}} = 9035\,K$$

x realni proces $\eta_{it} = \frac{W_{realni}}{W_{id}}$

$C_A = 21.22\ m/s$ $H_A = 772\ m$ $H_D = 182\ m$

$Q_D = 7.633\ m/s$ $P_A = 215,2\ MW$ $P_D = 247,2\ MW$

$W_A = P_A \cdot 8760\ h$ $W_D = 1472,56\ Wh$

VA1 $= 1819,6\ GWh$

(4.)

m/s	0	6	8	10	16	20	25
x god	15	36	26	9	5	2	12

→ 2 agregata: VA1 : $V_n = 8\ m/s$ VA2: 10 m/s

$D_1 = 40\ m$ $D_2 = 50\ m$

$\rho = 1.225\ kg/m^3$ $c_p = 0.5$

W, Wh - ?

$P = \frac{1}{2} \rho A c_p V^3$

$P_5 = \frac{1}{2} \rho \left(\frac{D}{2}\right)^2 \cdot \pi\ c_p \cdot V^3 \rightarrow P_{51} = 98,1\ kW$

$P_{52} = 75,2\ kW$

$P_8 \Rightarrow P_{81} = P_n = 197\ kW = P_{10} = P_{16}$ ← VA1

$P_{82} = 307,3\ kW$ ← VA2

$P_{10} = P_n = P_{16} = P_{20} = 601,3\ kW$ ← VA2

$W_{VA1} = 8760\ (x \cdot P_5 + y\ P_n) = 8760\ (0.33 \cdot P_5 + 0.52\ P_n) = 734,8\ MWh$

$W_{VA2} = 8760\ (x \cdot P_5 + y\ P_8 + z \cdot P_n) = 1656.1\ MWh$

↑ 0.26 ↑ 0.14