FIZIKA

A.1

$S_1 = 6 \text{ cm}^2$

$S_2 = 2 \text{ cm}^2$

$\Phi_v = 72 \frac{1}{\text{min}}$

$P_1 = 250 \text{ kPa}$

P_1, v_1 | S_1 | S_2, P_2, v_2

$P_2 = ?$

$S_1 v_1 = S_2 v_2$

$\Phi_m = v \cdot S$

$v_1 = \dfrac{\Phi}{S_1} = \dfrac{72 \cdot 10^{-3} \text{ m}^3 \cdot 10^{4}}{6 \cdot 10^{4} \text{ m}^2 \cdot 60 s} = \dfrac{72}{32} \dfrac{m}{s} = 2 \dfrac{m}{s}$

$v_2 = \dfrac{\Phi_m}{S_2} = \dfrac{72 \cdot 10^{-3} \text{ m}^3}{60 s \cdot 2 \cdot 10^{4} \text{ m}^2} = \dfrac{72 \text{ m}}{12 \text{ s}} = 6 \dfrac{m}{s}$

$P_1 + \dfrac{1}{2} \rho v_1^2 = P_2 + \dfrac{1}{2} \rho v_2^2$

$P_2 = P_1 - \dfrac{1}{2} \rho (v_2^2 - v_1^2) = 250 \text{ kPa} - \dfrac{1}{2} \cdot 1000 \dfrac{kg}{m^3} \cdot \left(\left(6 \dfrac{m}{s} \right)^2 - \left(2 \dfrac{m}{s} \right)^2 \right)$

$P_2 = 250 \text{ kPa} - 500 \dfrac{kg}{m^3} \cdot 32 \dfrac{m^2}{s^2} = 250 \text{ kPa} - 16\,000 \dfrac{kg}{m \cdot s^2}$

$P_2 = 250 \text{ kPa} - 16 \text{ kPa} = \underline{\underline{234 \text{ kPa}}}$

$P_d = \dfrac{N}{m^2} = \dfrac{kg \cdot m}{s^2 \cdot m^2}$

A.2

$m_p = 0,3\, kg$

$T_p = 100\,°C$

$m_{vo} = 8\, kg$

$T = 0\,°C$

$c_{vo} = 4200\, \frac{kJ}{kg\, k}$

$c_{pose} =$

$Q_1^+ = 0,3 \cdot 4,27\, \frac{MJ}{kg} = 0,681\, MJ$

$Q_1^- = c_{voo} \cdot \Delta T \cdot m_{vode} = 8kg \cdot 4200\frac{J}{kg\,k} \cdot 100\,k = 800 \cdot 4200\, J = 3,36\, MJ$

$Q = Q_1^+ - Q_1^- = 0,681\,MJ - 3,36\,MJ = -2,7\,MJ$

$Q = m \cdot c \cdot \Delta T = m_{p+v} \cdot c_{vode} \cdot \Delta T$

$\Delta T = \frac{Q}{m_{p+v} \cdot c_{vode}} = -\frac{2700\ kJ\ kg\ K}{8,3\,kg \cdot 4,2\ kg} = -77,5\,k$

$$
\begin{array}{r}
8\ 0\ 0 \cdot\ \ 4\ 2\ 0\ 0 \\
\hline
1\ 0\ 0\ 0\ 0\ 0 \\
3\ 2\ 0\ 0 \\
\hline
3,3\ 6\ 0,0\ 0\ 0\ \ = 3,36\ MJ
\end{array}
$$

$T = T_z + \Delta T = 100\,°C - 77,5\,k = 22,5\,°C$

<u>$8,3\,kg$ VODE @ $22,5\,°C$</u>