FIZIKA

A.1

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

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

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

$P_1 = 250 \text{ kPa}$

$P_1, v_1 \quad S_1$

S_2, P_2, v_2

$P_2 = ?$

$S_1 v_1 = S_2 v_2$

$\Phi_m = v \cdot S$

$v_1 = \dfrac{\Phi}{S_1} = \dfrac{72 \cdot 10^{-4} \, \text{m}^2 \cdot 10^1}{6 \cdot 10^{-4} \text{m}^2 \cdot 60 s} = \dfrac{72}{32} \, \dfrac{\text{m}}{s} = 2 \dfrac{\text{m}}{s}$

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

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

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

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

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

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

A.2

$m_p = 0,3 \, kg$

$T_p = 100°C$

$m_{vo} = 8 \, kg$

$T = 0°C$

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

$c_{pt} =$

$Q_1^+ = 0,3 \cdot 227 \, \frac{MJ}{kg} = 0,681 \, MJ$

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

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

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

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

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

$T = T_2 + \Delta T = 100°C - 77,5 \, k = 22,5°C$

$\underline{8,3 \, kg \; VODE \; @ \; 22,5°C}$

POPRAVA   PONAVEJANJA

$S_1 = 2 \, dm^2$

$\Phi_m = 37 \frac{kg}{s}$

$S_2 = 0,6 \, dm^2$

$P_1 = 120 \, kPa$

$\Phi_m = \rho \cdot \Phi_V \Rightarrow \Phi_V = \frac{\Phi_m}{\rho} = 36 \frac{L}{s}$

$\Phi_V = S_1 \cdot v_1 \Rightarrow v_1 = \frac{\Phi_V}{S_1}$

$v_1 = \frac{36 \, dm^3}{s \cdot 2 \, dm^2} = 18 \frac{dm}{s}$

$v_1 = 1,8 \frac{m}{s}$

$\Phi_V = \Phi_{V_2} + \Phi_{V_2} = 2 \, \Phi_{V_2}$

$\Phi_V = v_2 \cdot S_2 = \frac{\Phi_V}{2} \Rightarrow v_2 = \frac{\Phi_V}{2 \cdot S_2}$

$v_2 = \frac{36 \, dm^2}{s \cdot 2 \cdot 0,6 \, dm^2} = 30 \frac{dm}{s} = 3 \frac{m}{s}$

$P_2 = $ moč >

2.

$m_{vode} = 2kg$ @ $0°C$

$m_{en} = 2 kg$ @ $0°C$

$P = 25 kW$

$t = 25 min$

$\eta = 80\%$

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$Q_2^- = (m_{vode} + m_{ero})\cdot c_{H_2O}\cdot \Delta T$

$Q_2^- = 4kg\ 4200\frac{J}{kg\cdot k}\cdot k\cdot 100\,K$

$Q_2^- = 1,62\,MJ$

$Q_1^t = P\cdot t\cdot \eta$

$Q_1^t = 25\cdot 10^3\,W\cdot 25\cdot 60\,s\cdot 0,8 =$

$= 37,5\cdot 10^6\cdot 0,8\,J = 30\cdot 10^6\,J \qquad W = \frac{J}{s}$

$Q_1^t = 30\,MJ$

$Q_1^- = m_{ero}\cdot q_I = 2\,kr\cdot 0,33\frac{MJ}{kr} =$

$Q_1^- = 0,66\,MJ$

$Q = Q_1^t - Q_1^- - Q_2^- = 27,72\,MJ$

2ndEiVN   N9PNEJ

3.

$r = 1$ m
$\Delta T = 400$ K
$d_{Fe} = 1,2 \cdot 10^{-5}$ K^{-1}

$\Delta \sigma = 3,02$ cm
$S_n =$

$N = 2 \pi r$
$\dfrac{\partial \sigma}{\sigma} = d \cdot \sigma T$

$\partial \sigma = d \cdot \Delta T \cdot \sigma = 1,2 \cdot 10^{-5}$ K$^{-1} \cdot 400$K $\cdot 2 \pi \cdot 1$ m
$\Delta \sigma = 30,2 \cdot 10^{-3}$ m $= 3,02$ cm

$S_n = \pi \cdot r_n^2 = \pi \cdot 1,03$ m$^2 = 3,33$ m^2

4.

$5_n \cdot 2,5_m \cdot 4_m$

$S = S_n \cdot 4_m \cdot 2,5_m$
$T_1 = 0$ °C
$P = 1$ bar $= 100$ kPa
$M = 29 \frac{z}{mol}$
$T_2 = 20$ °C

$\Delta N =$
$m =$

$PV = n \, RT$

$n = \dfrac{PV}{RT}$

$m = \dfrac{PVM}{RT} = \dfrac{100 \text{kPa} \cdot 50 \cdot 10^3 L \cdot 29 \frac{g}{mol} K}{mol \cdot 8,314 \frac{L \cdot Pa}{K} \cdot 273 K}$

$m = 63,9$ kg

$m_2 = \dfrac{100 \cdot 50 \cdot 10^3 \cdot 29 \text{ g}}{8,314 \cdot 293} = 59,5$ kg

PROBLEME REŠUJTE KO SO SE MEŠANI —OMAHNR 2022

MEŠANICA PLINOV

$N \Rightarrow$ ŠTEVILO USEH ATOMOV V MEŠANCI

$$O_1 = \frac{N_1}{N}$$

$$O_2 = \frac{N_2}{N}$$

SOKE:

PROCENTNA SESTAVA
JE DEFINIRANA 2 ST. MOLEKUL

$$P_1 \cdot V = N_1 \cdot k \cdot T$$

$$P_2 \cdot V = N_2 \cdot kT$$
$$\vdots$$

$P_1, P_2, P_3, \dots$ —DELNI / PARCIALNI
TLAKI

$$(P_1 + P_2 + \dots P_n) \cdot V = (N_1 + N_2 + \dots N_n) \cdot k \cdot T$$

$$P = P_1 + P_2 + \dots + P_n$$

$$P \cdot V = N \cdot k \cdot T \quad \leftarrow$$

TLAK MEŠANICE JE ENAK VSOTI DELNIH (PARCIALNIH) TLAKOV
MEŠANICE.

$$1 \text{ bar} = 100 \text{ kPa} \qquad 1 \text{ mBar} = 0,1 \text{ kPa}$$

$T = 20°C = 293K$

$P_{H_2O} = 13,3 \text{ m bar} = 1,3 \text{ kP}_a \quad PV = \frac{m}{M} RT$

$V = 1 m^3$

$M_{H_2O} = 18,15 \frac{g}{mol}$

$m = ?$

$PVM = mRT$

$$m = \frac{PVM}{RT} = \frac{1,33 \text{ kPa} \cdot 10^3 \text{ K} \cdot 18,15 \frac{g}{mol} \cdot \cancel{K}}{\cancel{mol} \cdot 8,314 \text{ kPa} \cdot \cancel{K} \cdot 293 \cancel{K}}$$

$$m = 9,91 \text{ g} = 0,01 \text{ kg}$$