$\boxed{\text{U 9-7}}$
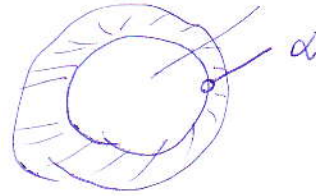
$L = 1.8 \ m$

$d_2 = 0.02 \ m$

$d_1 = 0.02 - 0.002 \cdot 2 = 0.016 \ m$

$\dot{m} = 0.25 \ kg/s \quad benzen$

$\bar{t} = 40 °C$

$\varrho = 858 \ kg/m^3$

$\eta = 0.4965 \cdot 10^{-3} \ Pa \cdot s$

$ln(\eta) = A + B/T + CT + DT^2 \qquad T = 273.15 + 40 = 313.15$

$A = 4.612$

$B = 148.9$

$C = -25.44 \cdot 10^{-3}$

$D = 22.22 \cdot 10^{-6}$

$ln(\eta) = -0.7 \ \rightarrow \eta = 0.4965 \cdot 10^{-3} \ Pa \cdot s$

$A = \dfrac{\pi d_1^2}{4} = 0.2011 \ m^2$

$v = \dfrac{\dot{m}}{\varrho \cdot A} = 1.449 \ m/s$

$Re = \dfrac{v \cdot d_1 \cdot \varrho}{\eta} = 40 \ 069 \quad \underline{turbulentní}$

$Pr = \dfrac{\eta \ c_p}{\lambda}$

$c_p = a + bT + cT^2 + dT^3 \qquad c_p = 1.765 \ \frac{kJ}{kg \ K}$

$c_p = 1.765 \ kJ/kg \ k$

$a = 1.82323$

$\lambda = 0.142$

$b = -3.13091 \cdot 10^{-3}$

$c = 0.94065 \cdot 10^{-5}$

$d = 0$

$Pr = \dfrac{0.4965 \cdot 10^{-3} \cdot 1.765 \cdot 10^3}{0.142}$

$A = 0.17763$

$B = 0.0477 \cdot 10^{-4}$

$C = -3.7807 \cdot 10^{-7}$

$= \underline{\underline{6.171}}$

$\lambda = A + BT + CT^2 = 0.142 \ W/mK$

$Nu = 0.023 \ Re^{0.8} \ Pr^{0.4} = 229.14$

$Nu = \dfrac{\alpha \cdot l}{\lambda} \implies \alpha = \dfrac{Nu \cdot \lambda}{d_1} = 2034 \ W/m^2K$