TD N°01

Ex1 : $\rho = \frac{m}{V}$

$G = \frac{P}{V} = \frac{mg}{V} = \rho g$

$d = \frac{\rho_c}{\rho_{eau}}$

1) $P = mg \Rightarrow m = \frac{P}{g} = \frac{94 \times 10^3}{9,81} = 9583 \text{ kg}$

$\rho = \frac{m}{V} = 8,5 \text{ kg/l}$

2) $\omega = \frac{P}{V} = 7833 \text{ N.m}^{-3}$

3) $d = \frac{\rho}{\rho} = \frac{798,5}{1000} = 0,7985$

Ex2 : real → perfect

$\tau = \mu \frac{dv}{dH}$

$a = 0 \Rightarrow V = cte$

$\tau = \mu \frac{V}{H} = 0,29 \times \frac{3}{2 \times 10^{-2}}$

$\tau = 43,5 \text{ Pa}$

Ex3 : $\nu = \frac{\mu}{\rho}$

1 stokes $= 10^{-4} \text{ Pa.s}$

$\mu_\omega = 10^{-3} \text{ Poise} = 0,1 \times 10^{-3} \text{ Pa.s}$

$\mu_A = 0,0183 \times 10^{-3} \text{ Poise} = 1,83 \times 10^{-5} \text{ Pa.s}$

$\nu_\omega = \frac{\mu}{\rho} = \frac{0,1 \times 10^{-3}}{1000} = 10^{-7} \text{ m}^2/\text{s}$

$\nu_A = \frac{\mu}{\rho} = \frac{1,83 \times 10^{-5}}{1,293} = 1,415 \times 10^{-5} \text{ m}^2/\text{s}$

$\nu_\omega = \frac{10^{-3}}{10^{-4}} = 10^1 \text{ stoke}$

$\nu_A = 0,014 \text{ stoke}$

Ex4 :

$\tau = \Delta t \, \mu \frac{dv}{dH} \qquad \frac{F}{S} = \mu \frac{V}{H}$

$\frac{F}{S} = \mu \frac{V}{H} \Rightarrow \mu = \frac{FH}{SV} = \frac{mgh}{S.V}$

n.a :

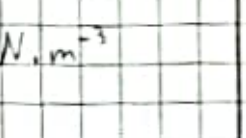
$\mu = \frac{8 \times 10^{-3} \times 0,3 \times 10^{-3} \times 9,81}{0,15 \times 1,5} = 1,0464 \times 10^{-5} \text{ Pa.s}$

Ex5 :

$\tau = \mu \frac{dV}{dH} = 13 \times 10^{-4} \times \frac{0,0072}{3600 \times 0,2 \times 10^{-3}}$

$\tau = 1,3 \times 10^{-4} \text{ Pa}$

Ex6 :



$F = F_A + F_2$

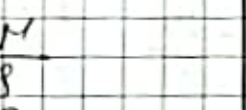
$\tau_A = \frac{F_A}{A} \Rightarrow F_A = \tau_A \cdot A = \mu \frac{V}{H} A$

n.a :

$F_A = 0,785 \times \frac{0,5}{1,25 \times 10^{-2}} \times 0,75$

$F_A = 23,55 \text{ N}$

$F_A = F_2 \Rightarrow F = 2F_A = 47,1$



$F_A = \tau . A = \mu \frac{V}{H} A = 0,785 \frac{0,5}{1,5 \times 10^{-2}} \times 0,75$

$F_A = 19,63 \text{ N}$

$F_2 = \mu \frac{V}{H} A = 0,785 \times \frac{0,5}{1 \times 10^{-2}} \times 0,75$

$F_2 = 29,44 \text{ N}$

$F = F_A + F_2 = 49,07 \text{ N}$