Pascal's lov

Trykket øker jevn i hele volum.

Ref: Ballong

Kan brukes i f.eks hydrauliske pumper

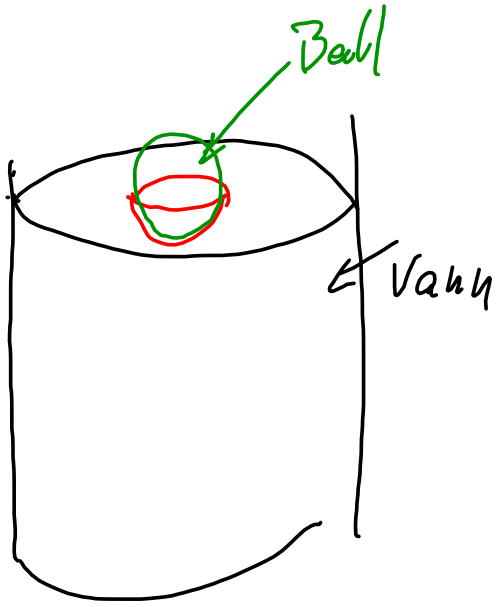
$$p = \frac{F_1}{A_1} \qquad p = \frac{F_2}{A_2}$$

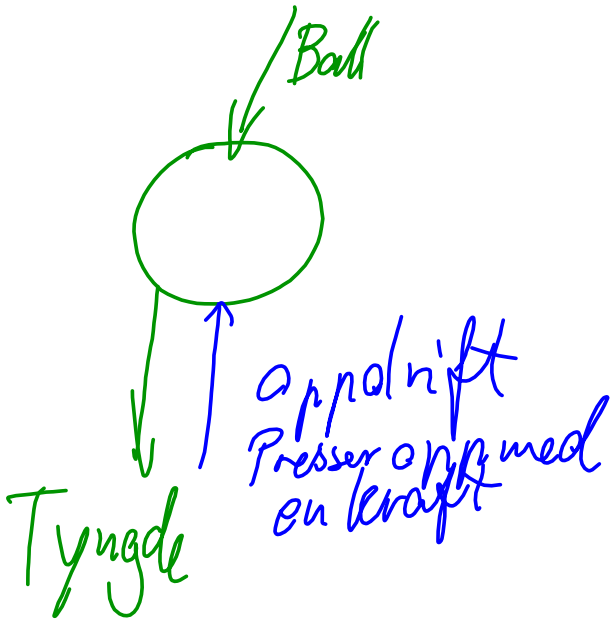
$$\frac{F_1}{A_1} = \frac{F_2}{A_2}$$

$$F_2 = F_1 \cdot \frac{A_2}{A_1}$$

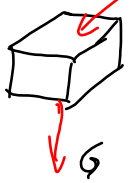
Oppdrift

Oppdriften er lik tyngden av det som blir fortrengt





6.13



$\rho_J = 7{,}8\ g/cm^3$

$V_J = 4{,}0\ cm^3$

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

$m = \rho \cdot V$

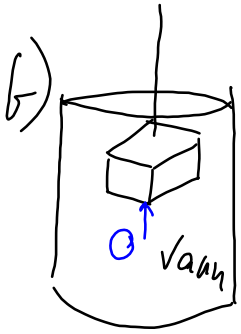
a) Tyngdekraften $G = m \cdot g$

$G = \rho_J \cdot V_J \cdot g = 7{,}8\left[\frac{g}{cm^3}\right] \cdot 4{,}0\left[cm^3\right] \cdot 9{,}8\left[\frac{m}{s^2}\right]$

$G = 0{,}306\left[kg \cdot \frac{m}{s^2}\right] = 0{,}31\,[N]$

N

b)



O: er tyngden av det vannet som blir fortrengt

← massen til vannet som blir fortrengt

$O = m_V \cdot g$

Tyngden av vannet som blir fortrengt

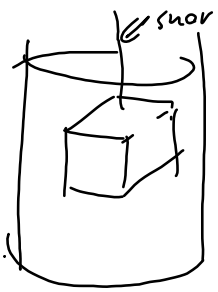
$O = \rho_V \cdot V_J \cdot g = 1000\left[\frac{kg}{m^3}\right] \cdot 4{,}0(0{,}01)^3\left[m^3\right] \cdot 9{,}81\left[\frac{m}{s^2}\right]$

$O = 0{,}039\ N$

c)

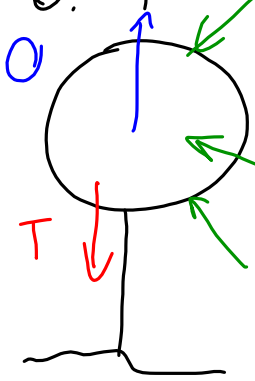
$\sum F = m_V \cdot g = 0{,}039\ N$

se side 158 i boka



$G_N = G - O = 0{,}31 - 0{,}04 = 0{,}27\,N$

6.14



Ballong: $V = 10\ m^3$

Luft: $\rho_L = 1{,}24\ kg/m^3$

Hydrogen $\rho_H = 0{,}090\ kg/m^3$

Ballonghylster: $m_{BH} = 2{,}0\ kg$

$$O = \rho_L \cdot V \cdot g = 1{,}24 \cdot 10 \cdot 9{,}81 \left[\frac{kg}{m^3} \cdot m^3 \cdot m/s^2\right]$$

(N)

a)

$$= 121{,}6 \left[kg \cdot m/s^2\right] = 121{,}6\ [N]$$

b)

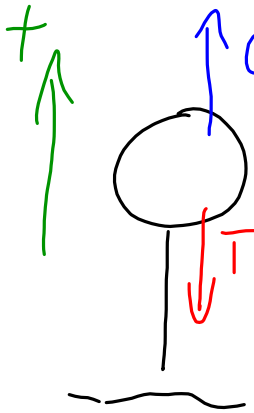
$$T = m_{BH} \cdot g + \rho_H \cdot V \cdot g = g\left(m_{BH} + \rho_H \cdot V\right)$$

Tyngden av ballonghylsteret — Tyngden av gassen i ballongen

$$T = 9{,}81\ (2{,}0 + 0{,}090 \cdot 10)\left[m/s^2\ kg\right]$$

(kg/m^3, m^3)

$$= 9{,}81 \cdot 2{,}9 = 28{,}5\ [N]$$

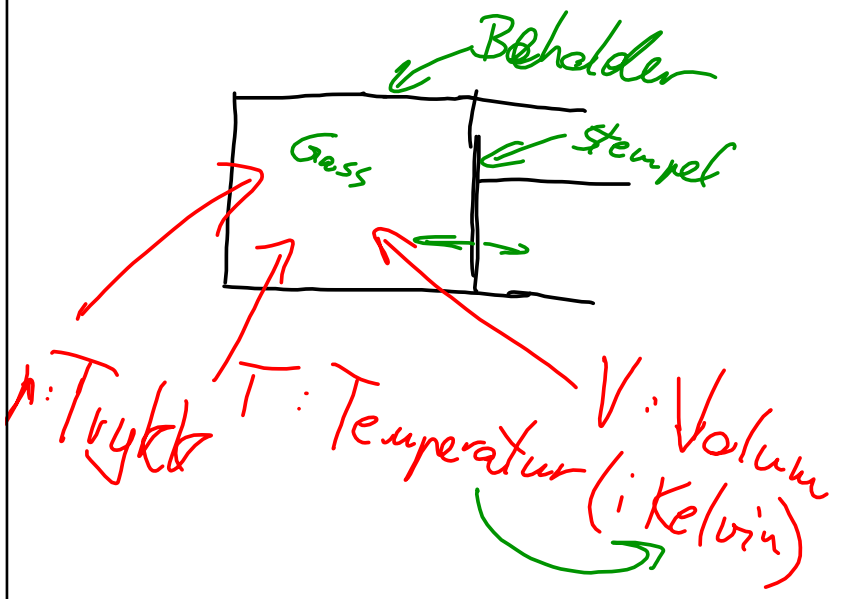


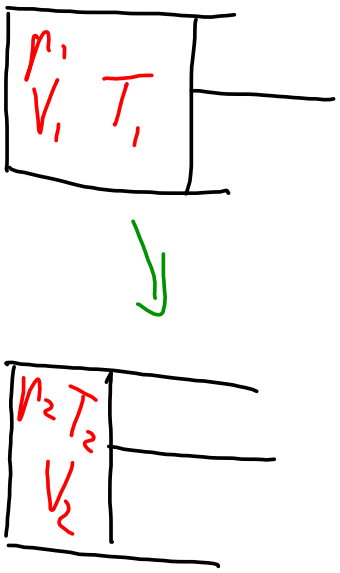
Snordraget $= O - T$

$= 121{,}6 - 28{,}5 = 93{,}1\ [N]$

oppover

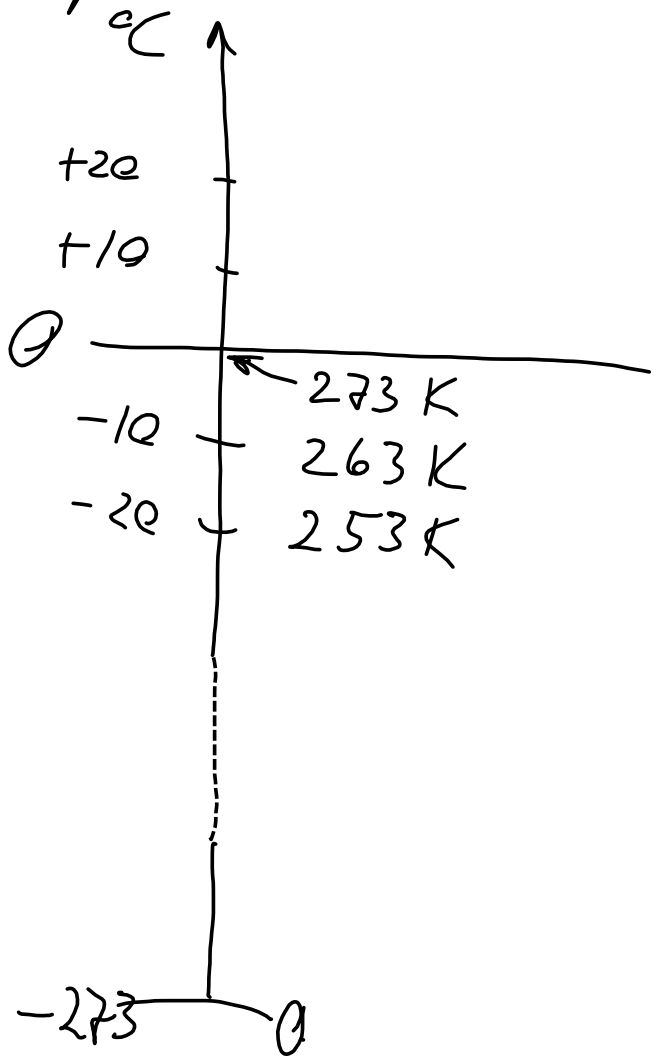
Tilstandslikning





$$\frac{p_1 \cdot V_1}{T_1} = \frac{p_2 \cdot V_2}{T_2}$$

Temperatur : Kelvin – Celsius



6.20 $\frac{pV}{T}$

$p_1 = 100\ kPa \quad V_1 = 1{,}50\ dm^3$

$T_1 = 27 + 273 = 300\ K$

$p_2 = ? \quad V_2 = 0{,}800\ dm^3$

$T_2 = 327 + 273 = 600\ K$

$$\frac{p_1 V_1}{T_1} = \frac{p_2 V_2}{T_2}$$

$$p_2 = \frac{p_1 \cdot V_1 \cdot T_2}{T_1 V_2} = \frac{100\,[kPa] \cdot 1{,}50\,[dm^3] \cdot 600\,[K]}{300\,[K] \cdot 0{,}800\,[dm^3]}$$

$$= 375\,[kPa]$$