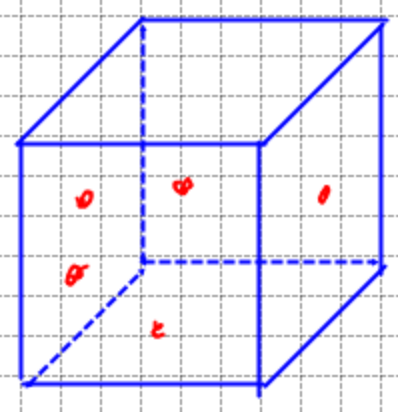
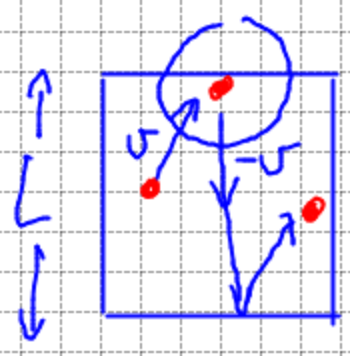




$$F = m \cdot a$$

$$a = \frac{\Delta v}{\Delta t}$$

$$F = \frac{m \cdot \Delta v}{\Delta t} \rightarrow \Delta p$$

$$\Delta v = v_f - v_i$$

$$v_i = v \quad v_f = -v$$

$$\Delta v = |-v - v|$$

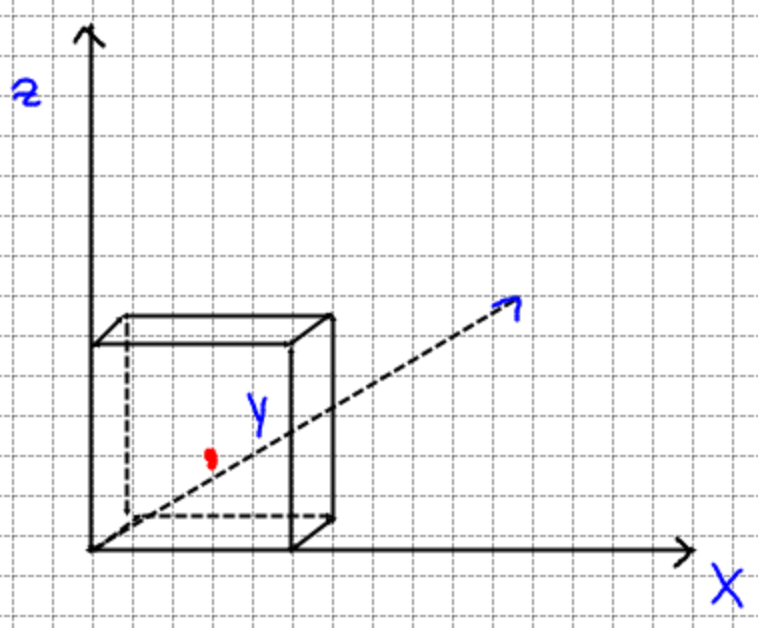
$$\Delta v = 2v$$

$$\Delta t = \frac{\Delta s}{v} \Rightarrow \Delta t = \frac{2L}{v}$$

$$\Delta s = 2L$$

$$p = \frac{F}{S} \qquad p = \frac{\frac{mv^2}{L}}{L^2} \qquad p = \frac{mv^2}{L^3} \qquad p = \frac{mv^2}{V}$$

$$pV = mv^2 \qquad pV = 2\left(\frac{1}{2}mv^2\right) \qquad pV = 2\left(E_{cin}\right)$$



$$\langle v^2 \rangle = \langle v_x^2 \rangle + \langle v_y^2 \rangle + \langle v_z^2 \rangle$$

$$\langle v^2 \rangle = 3\langle v_x^2 \rangle$$

$$\langle v_x^2 \rangle = \frac{1}{3}\langle v^2 \rangle$$

$$pV = 2\left(\frac{1}{2}m\langle v_x^2 \rangle\right)$$

$$pV = \frac{2}{3}\left(\frac{1}{2}m\langle v^2 \rangle\right)$$

$$pV = \frac{2}{3}\left(\langle E_{cin} \rangle\right)$$

$$pV = nRT \qquad nRT = \frac{2}{3}\langle E_{cin} \rangle$$

n. 7 p. 391

$V = 10\ l$

$n = 1\ mol$

NH_3

$p = 2{,}5\ bar$

$\langle E_{cin} \rangle = ?$

$\langle E_{cin} \rangle = \frac{3}{2} K T$

$pV = nRT$

$T = \frac{pV}{nR} = \frac{2{,}5 \cdot 10^5\ Pa \cdot 10 \cdot 10^{-3}\ m^3}{1\ mol \cdot 8{,}314\ \frac{J}{K \cdot mol}} =$

$1\ bar = 1 \cdot 10^5\ Pa \qquad T = 3 \cdot 10^2\ K = 300\ K$

$1\ Pa = \frac{N}{m^2} = \frac{1\ kg \cdot 1\ m/s^2}{m^2} = kg/ms^2 = J/m$

$\text{energia} \leftarrow \frac{(Pa \cdot m^3) \cdot K}{J} = \frac{J \cdot K}{J}$

$\langle E_{cin} \rangle = \frac{3}{2} \cdot 1{,}38 \cdot 10^{-23} \cdot 300K = 621 \cdot 10^{-23}\ J$

$K = \frac{R}{N_A} = 1{,}38 \cdot 10^{23}$

n 13 pag. 392

$N_{molecole} = 2 \cdot 10^9$

$V = 1\ mm^3 = 1 \cdot 10^{-9}\ m^3$

$T = 20°C = 293\ K$

$pV = KNT$

$p = \frac{KNT}{V} = \frac{(1{,}38 \cdot 10^{-23})(2 \cdot 10^9)(293\ K)}{1 \cdot 10^{-9}\ m^3} \simeq 800 \cdot 10^{-5}\ Pa$

$\simeq 8 \cdot 10^{-3}\ Pa$

14

$m_1 = 1\ g$ di elio $\quad M_{He} = 4\ uma = 4\ g/mol \quad 1\ uma = 1{,}67 \cdot 10^{-27}\ Kg$

$m_2 = 1\ g$ di Argon $\quad M_{Ar} = 40\ uma = 40\ g/mol$

$T = cost$

$\Delta p = ?$

$n = \frac{m}{M} \qquad n_{He} = \frac{1\ g}{4\ g/mol} = 0{,}25\ mol$

$n_{Ar} = \frac{1\ g}{40\ g/mol} = 0{,}025\ mol$

$\frac{\Delta p}{p_0} \qquad \frac{\Delta p V}{p_0 V} = \frac{(n_{He} + n_{Ar})RT - n_{He}RT}{n_{He}RT}$

$\frac{\Delta p}{p_0} = \frac{n_{Ar}}{n_{He}} = \frac{4}{40} = 0{,}1 \qquad \frac{\Delta p}{p_0} = 10\%$