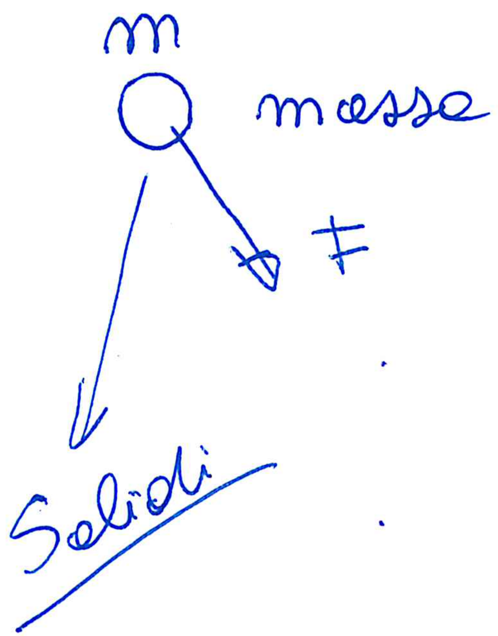


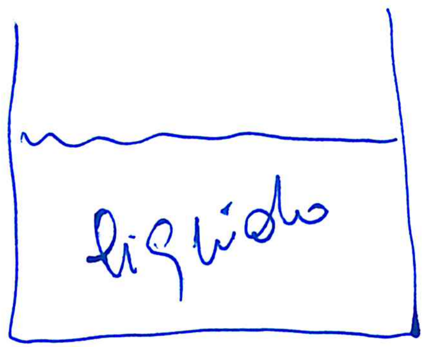
$$a = \frac{F}{m}$$

$L = \bar{F} \cdot \bar{s} \Rightarrow$ Energia

U Energia potenziale

$E_c = \frac{1}{2} m v^2$ = Energia Cinetica

$U + E_c$ = costante $\Rightarrow$ Energia Termica



$F \Rightarrow \frac{F}{S} = P$

$[N]$ $\quad \left[\frac{N}{m^2}\right] = [Pa]$

$m = \frac{m}{V} = \delta \quad \left[\frac{kg}{m^3}\right] \quad \left[\frac{g}{cm^3}\right]$

$kg \quad \left[\frac{kg}{m^3}\right]$

$1 g/cm^3$

$1000 kg/m^3$

2

Solidi

m

F

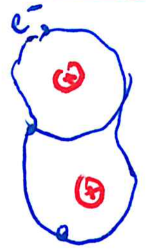
$E_c = \frac{1}{2} m V^2 \; [J]$

$U = mgh \; [J]$

$[J] + [J] = [J]$

$E_c + U_p = \text{Costante} \; [J]$

H_1^1



$1g$ H_2

1 mole / $2g$

$6.02 \cdot 10^{23}$ molecole di H_2

Liquidi

$\delta \leftarrow \frac{m}{V}$

P

$\left[\frac{J}{m^3}\right] \Rightarrow \frac{1}{2} \delta v^2$ Energia Cinetica per unità di Volume

$\left[\frac{N \cdot m}{m^2 \, m}\right] = \boxed{\left[\frac{J}{m^3}\right]} \Rightarrow \delta g h$ Energia "Potenziale" per unità di Volume

$\frac{1}{2} \delta \cdot v^2 + \delta g h + P = \text{costante} \left[\frac{J}{m^3}\right]$

$\Downarrow$

GAS

V

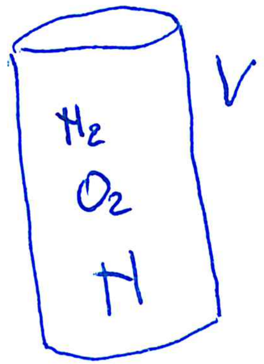
P

$N = n \cdot N_A$

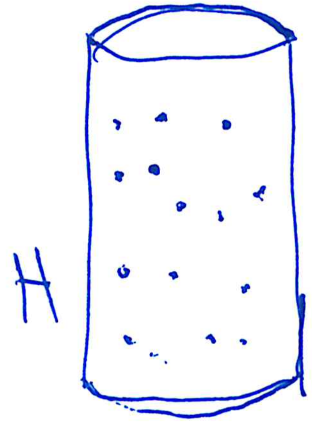
$N_A = 6.02 \cdot 10^{23}$

$10^9 \cdot 10^9 \cdot 10^5$

Pa



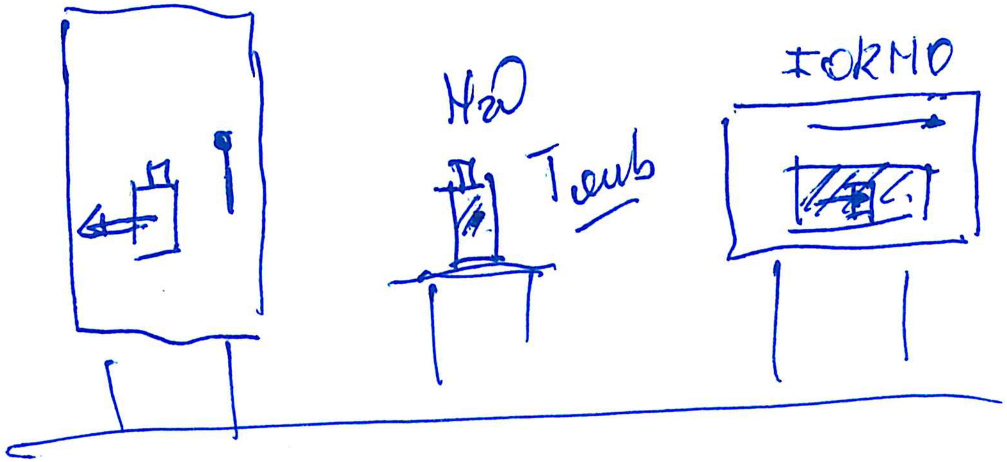
③



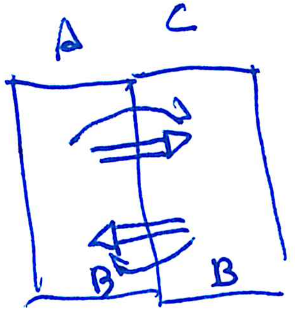
V

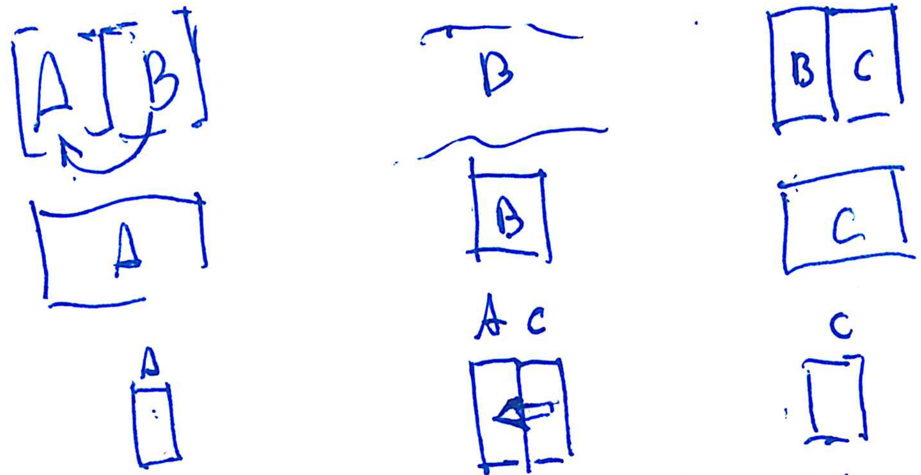
P

$\begin{cases} n \\ H \end{cases}$

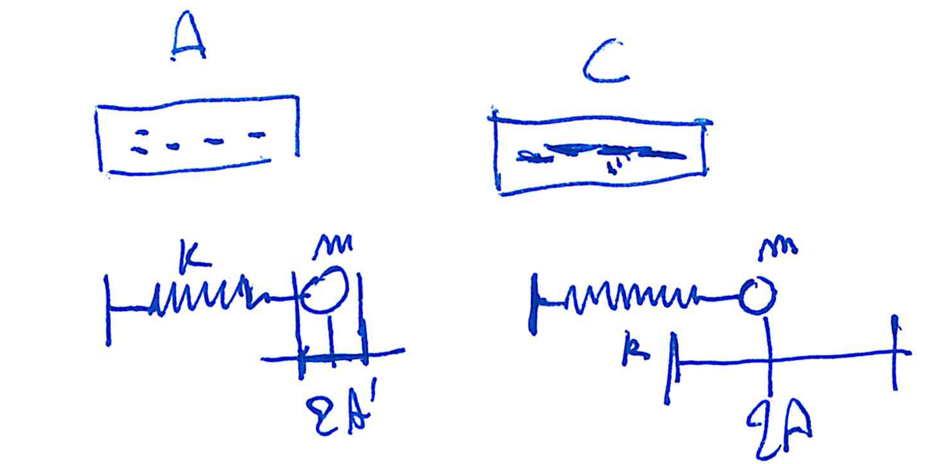


[A] [B] [E]

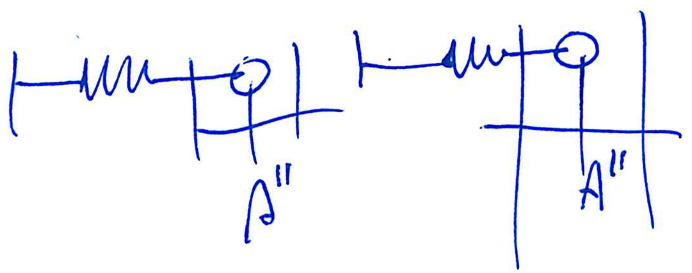




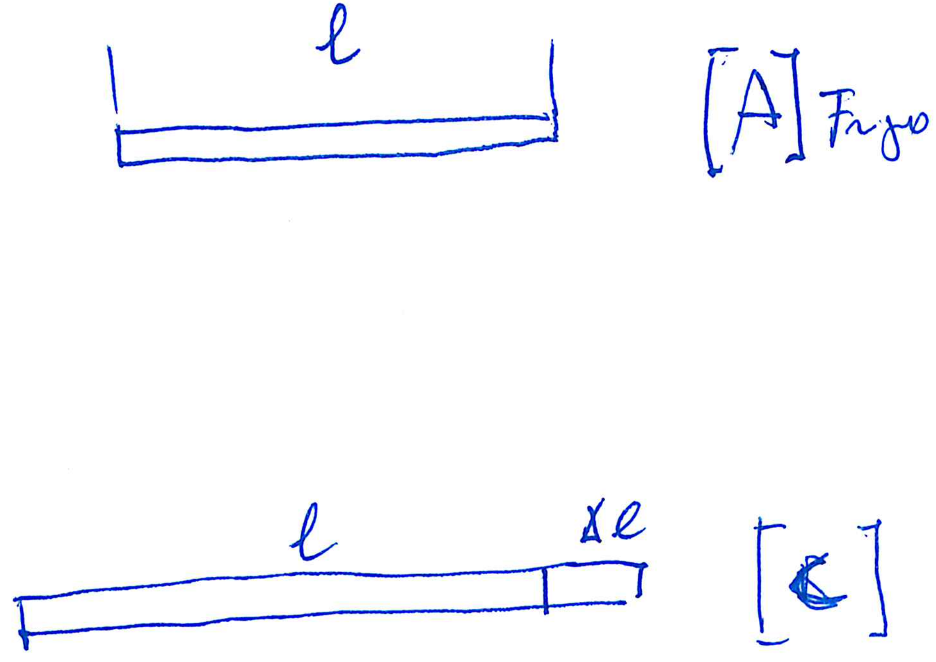
Flusso termico da C ad A



Modello oscillatori armonici



A = Ampiezza oscillazione



$$\Delta l = k\, l\,(C - A)$$

Δ stato Termico

B

Cambiamenti di stato

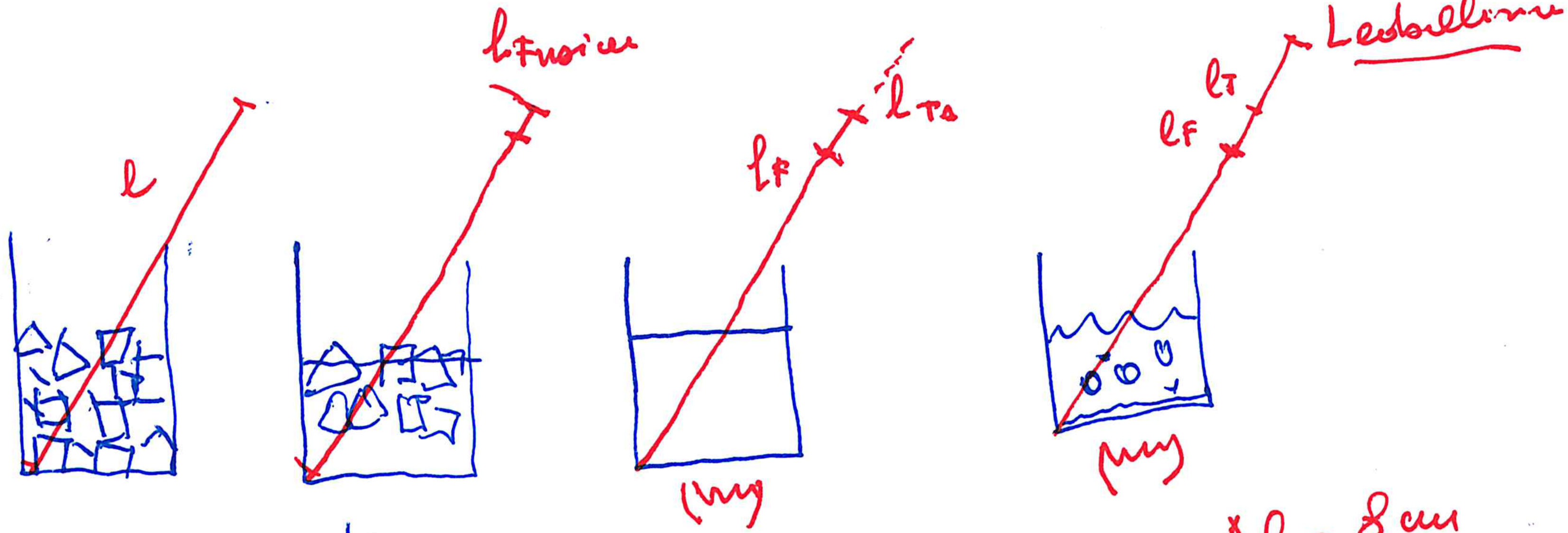
solido → liquido → vapore (gas)
costante
costante

SCALA CENTIGRADA

°C

$l_{Fusione} = 18,4$ cm

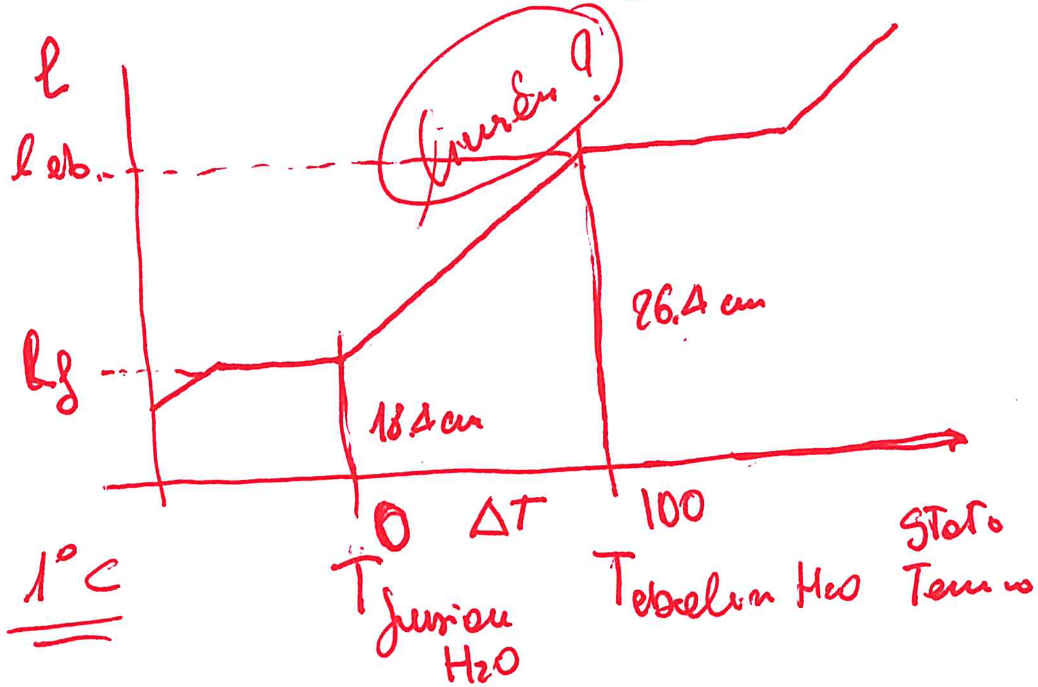
26,4 cm



Fusione

Ghiaccio
+
H_2O

$\Delta l = 8$ cm

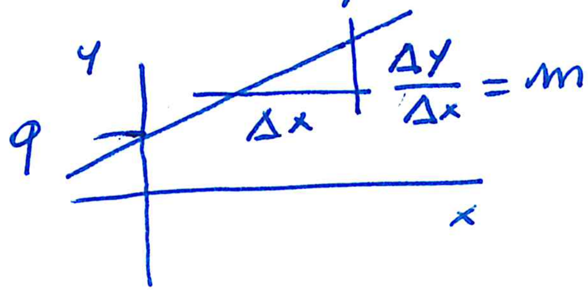


8 cm

$$\frac{80\ mm}{100^\circ} = 0{,}8\ mm \rightarrow 1^\circ C$$

Legge della dilatazione Termica

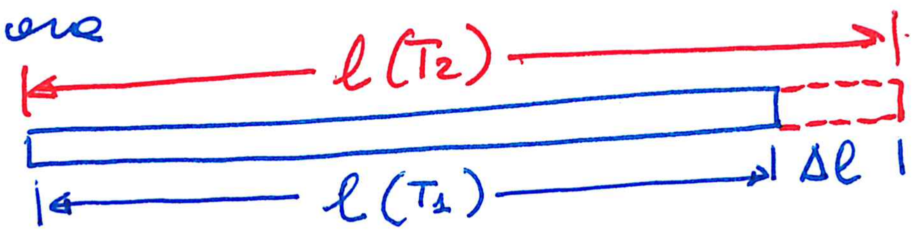
la lunghezza di una sbarra al variare della Temperatura ha un andamento lineare (rappresentato dalla equazione di una retta)



$$\frac{\Delta y}{\Delta x} = m$$

equazione retta $\quad y = mx + q$

per una sbarra

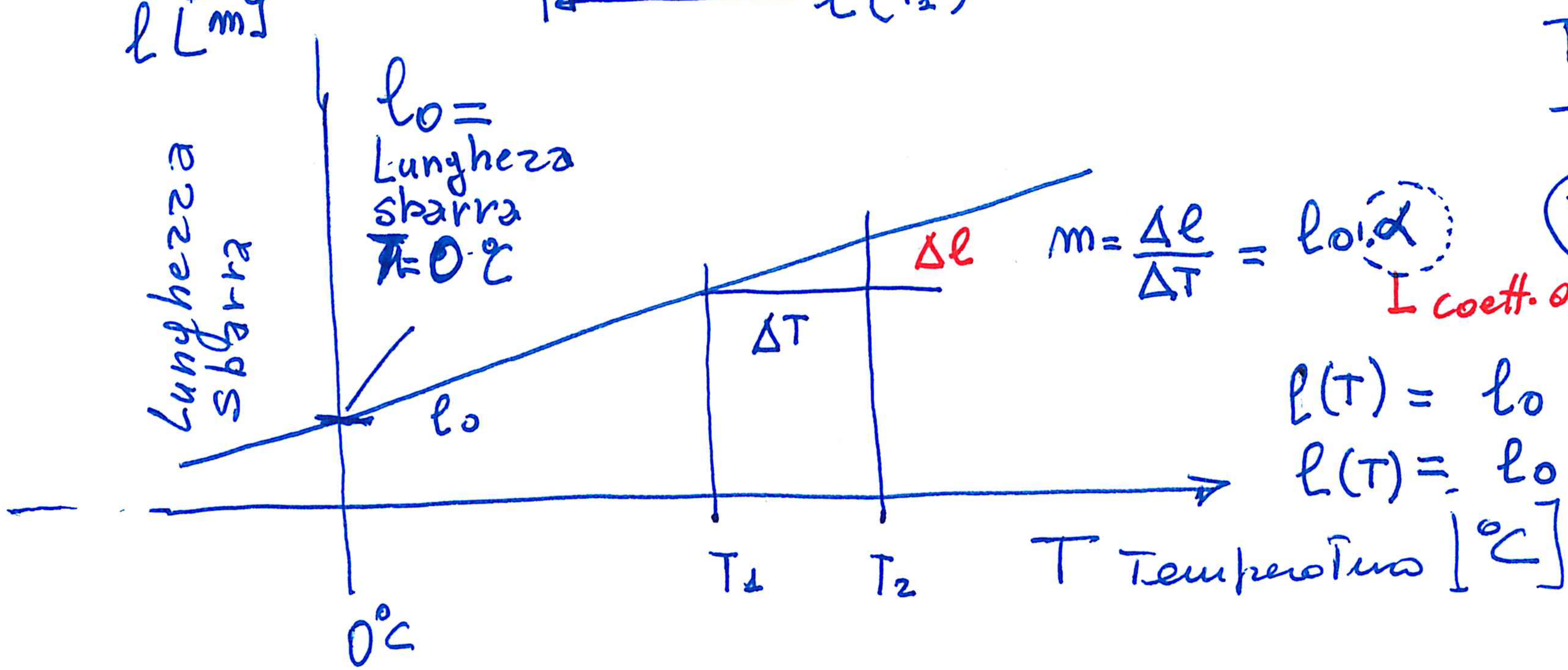


$$\Delta \ell = \ell(T_2) - L(T_1)$$

T_2 Temperatura 2

T_1 Temperatura 1

$(T_2 - T_1) = \Delta T$



$$m = \frac{\Delta \ell}{\Delta T} = \ell_0 \cdot \alpha$$

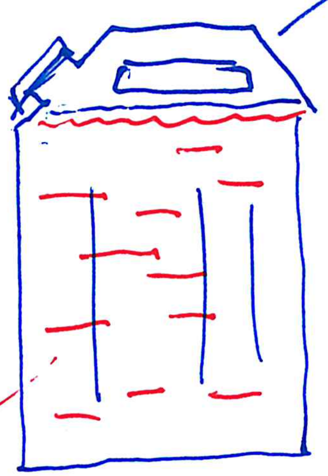
coeff. di dilat. Termica $\left[\frac{1}{°C}\right]$

$$\ell(T) = \ell_0 (1 + \alpha \cdot T)$$

$$\ell(T) = \ell_0 + \ell_0 \alpha \cdot T$$

Dilatazione Volumetrica

Tanica Ferro



Benzina

ESERCIZIO

$V = 20$ litri

Tanica di ferro $\beta = 35 \cdot 10^{-6}$

Benzina 20 litri $\beta = 950 \cdot 10^{-6}$

$10°C \Longrightarrow 25°C$

α = coeff. dilatazione lineare

$\beta = 3\alpha$ coeff. dilatazione volumetrico

Ferro $V_f = V_i\,(1 + 35 \cdot 10^{-6} \cdot 15°C)$

$= 20\,(1 + 35 \cdot 10^{-6} \cdot 15)$

$= 20\,(1 + 525 \cdot 10^{-6})$

$= 20\,(1 + 0.000525) \simeq 20\,l$

Benz $= 20\,(1 + 950 \cdot 10^{-6} \cdot 15)$

$= 20\,(1 + 0{,}014.2\cancel{5}0 \cdot 10^{-6})$ ~~250~~

10,014

$\simeq 0.28$ litri