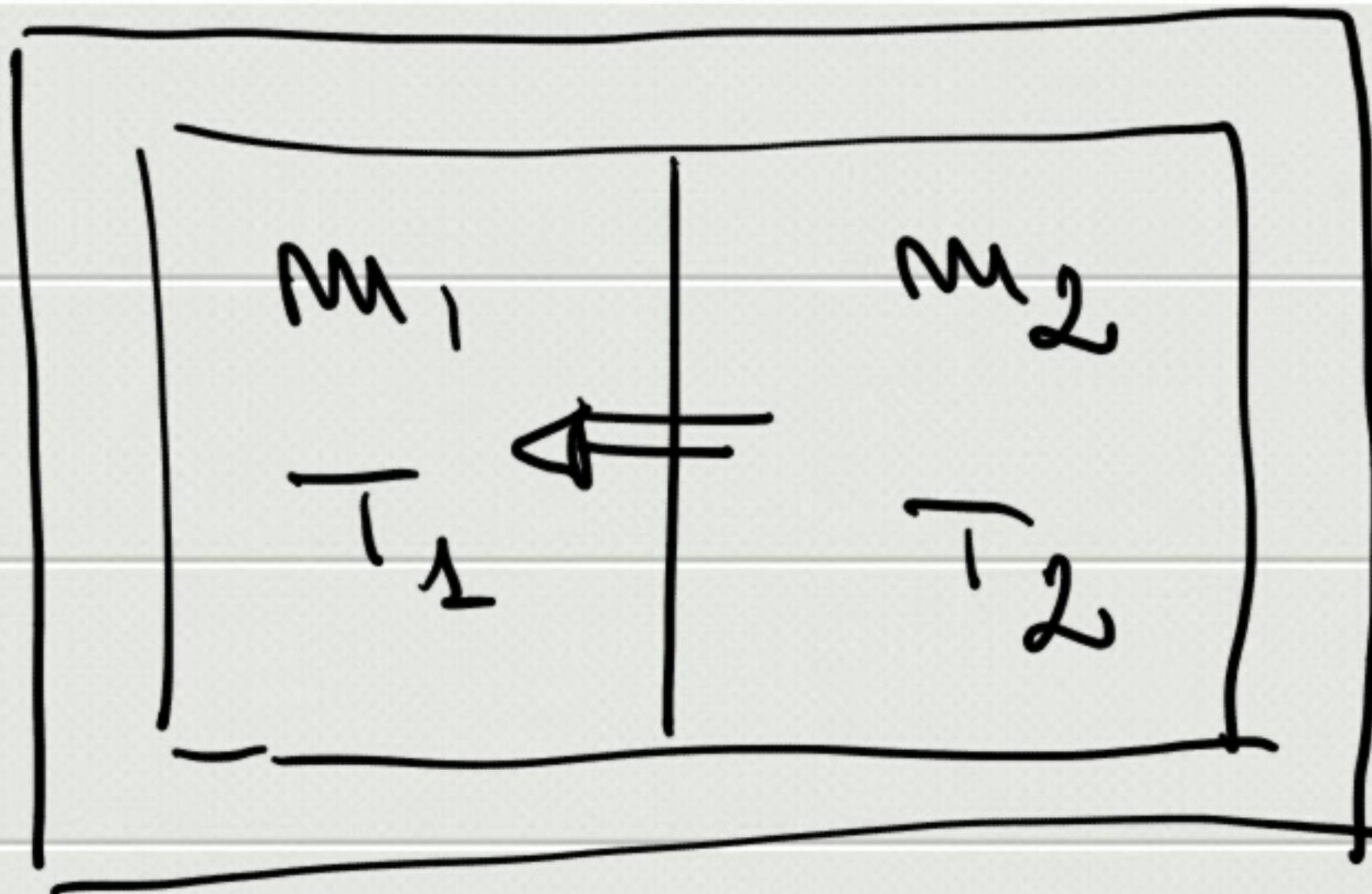


$$Q = \Delta U + W$$



$$T_2 > T_1$$

$$W_1 = W_2 = 0 \Rightarrow \left\{ \begin{array}{l} Q_1 = \Delta U_1 \\ Q_2 = \Delta U_2 \end{array} \right.$$

$$\underline{Q_1 + Q_2 = \Delta U_1 + \Delta U_2 = 0}$$

$$Q_1 = -Q_2 \quad \Delta U_1 = -\Delta U_2$$

$$Q \propto m \Delta T \Rightarrow \boxed{Q = mc \Delta T}$$

$$Q_{i \rightarrow f} = mc (T_f - T_i)$$

c : calore specifico $\Rightarrow c = c(\tau)$
dipende dalle sostanze

$$1: m_1, \tau_1, c_1$$

$$2: m_2, \tau_2, c_2$$

$$\Rightarrow Q_1 = -Q_2$$

$$\Rightarrow m_1 c_1 (\tau_e - \tau_1) = -m_2 c_2 (\tau_e - \tau_2)$$

$$\tau_e = \frac{m_1 c_1 \tau_1 + m_2 c_2 \tau_2}{m_1 c_1 + m_2 c_2} =$$

$$= \frac{c_1 \tau_1 + c_2 \tau_2}{c_1 + c_2}$$

$$C = mc \rightarrow c \text{ specifico termico}$$

$$\delta Q = mc dT \Rightarrow \boxed{c = \frac{1}{m} \frac{\delta Q}{dT}}$$

$$[c] = \text{J/kg K}$$

$$\delta Q = dU + \cancel{pdV} \Rightarrow \boxed{c = \frac{1}{m} \frac{dU}{dT}}$$

↓

puremente termico

$$Q = \int \delta Q = \int_{T_i}^{T_f} mc(\tau) d\tau = mc(T_f - T_i)$$

$c(\tau) = \text{cost}$

1 mol \Rightarrow # atomi

$$N_A = 6.022 \cdot 10^{23}$$

$$[c_m] = \text{J/K mole}$$

calore specifico moleare : $\boxed{c_m = \frac{1}{N} \frac{\delta Q}{dT}}$

$N \rightarrow$ numero di moli

$$C_{H_2O} = 4186.6 \text{ J/kgK} = 1 \text{ Cal}$$

|

$$\Delta T = (15.5^\circ\text{C} - 14.5^\circ\text{C})$$

Θ

Processi isotermi $(T = \text{cost})$

cambiamenti di fase

$\text{sol} \rightarrow \text{liq}$

fusione

$\text{liq} \rightarrow \text{sol}$

solidificazione

$\text{liq} \rightarrow \text{vap}$

evaporazione

$\text{vap} \rightarrow \text{liq}$

condensazione

$\text{sol} \leftrightarrow \text{vap}$

sublimazione

$$Q \propto m \Rightarrow Q = m \lambda$$

λ : calore latente

$$\lambda = \lambda(\text{substanz, camb. di fase})$$

$$[\lambda] = \text{J/kg}$$

$$\lambda_{\text{evap}} \rightarrow \lambda_{\text{eb}}$$

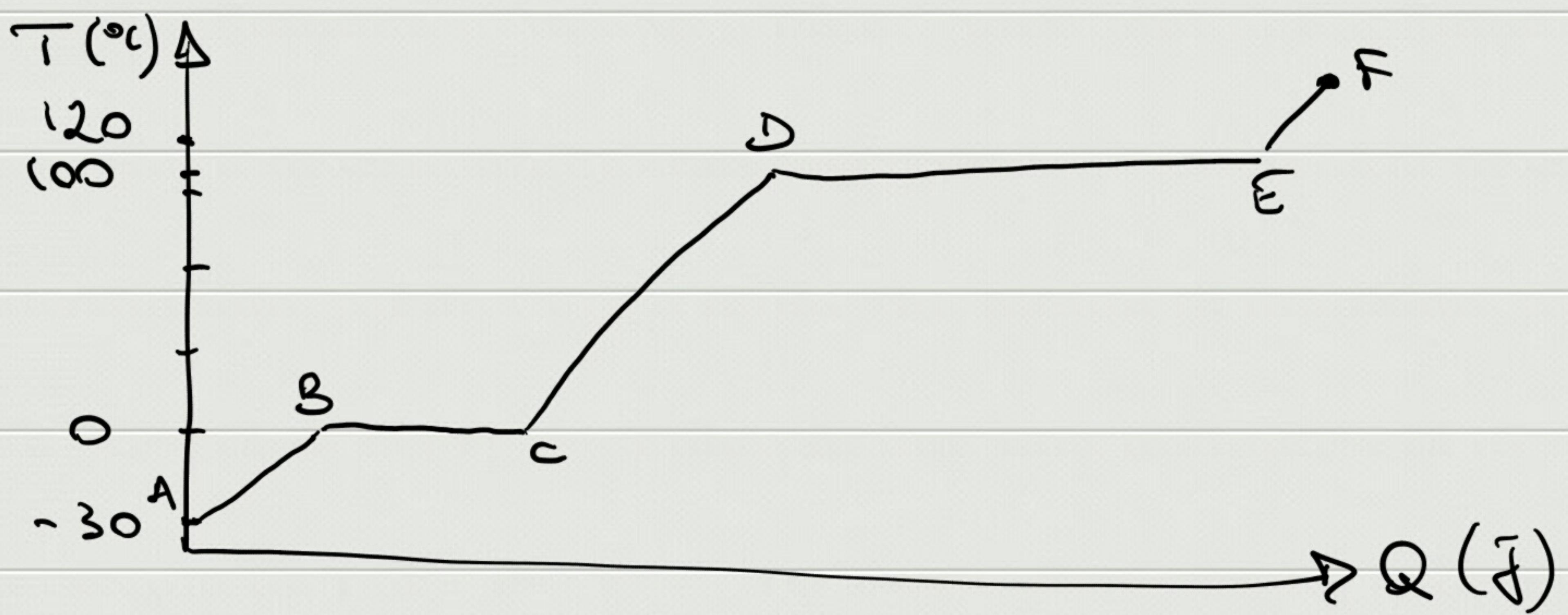
$$Q_{\text{TOT}} = ? \quad m = 10^{-3} \text{ kg} \quad T_i = -30^\circ \text{C}$$

(esque)

$$T_f = 120^\circ \text{C}$$

camb. fase $Q = m \lambda_{\text{cp}}$

variazioni T $Q = mc (T_f - T_i)$



$$\Delta AB : Q_{AB} = mc_{\text{ph}} \Delta T_{AB} = 61.5 \text{ J}$$

$$\Delta BC : Q_{BC} = m \lambda_{\text{gh}} = 330 \text{ J}$$

$$\Delta CD : Q_{CD} = mc_{\text{H}_2\text{O}} \Delta T_{CD}$$

$$\Delta DE : Q_{DE} = m \lambda_{\text{eb}}$$

$$\Delta EF : Q_{EF} = mc_{\text{vap}} \Delta T_{EF}$$

$$Q_{\text{TOT}} = 3110 \text{ J}$$