

Clase 7 30 Septiembre 2020

Título de la nota

30/09/2020

$$PV = nRT$$

$$PV = \left(\frac{N}{m^2} \right) (m^3) = N \cdot m = \text{Joule} = J$$

$$nRT = (\cancel{\text{mol}}) \left(\frac{\text{J}}{\cancel{\text{molK}}} \right) (\cancel{\text{K}})$$

$$R = \frac{\text{J}}{\text{mol K}}$$

$$\text{J} = \text{J}$$

$$pV = nRT$$

Condición normal

1 bar 22.4 L

273.15 K

condición standard

1 mol

→ 298.15 K $V \neq V_{\text{normal}}$

$$pV = nRT$$

$$R = \frac{pV}{nT} = \frac{(1 \text{ bar})(22.4 \text{ L})}{(1 \text{ mol})(273.15 \text{ K})}$$

$$= \left[\frac{(1 \cancel{\text{ bar}})(1.013 \times 10^5 \text{ Pa})}{(1.013 \cancel{\text{ bar}})} \right] \left[\frac{(22.4 \cancel{\text{ L}})(\frac{1 \text{ m}^3}{10^3 \cancel{\text{ L}}})}{\cancel{\text{K}}} \right]$$

$$R = \frac{\left(\frac{1 \times 10^5 \text{ N}}{\text{m}^2} \right) \left(22.4 \times 10^{-3} \text{ m}^3 \right)}{(1 \text{ mol}) (273.15 \text{ K})} = \frac{8.307 \text{ J}}{\text{mol K}} \approx \frac{8.314 \text{ J}}{\text{mol K}}$$

$$1 \text{ atm} = 1.013 \text{ bar} \quad \checkmark$$

$$R = \frac{\text{atm L}}{\text{mol K}}$$

$$V = 22.4 \text{ L}$$

$$p = 1 \text{ bar}$$

$$T = 273.15 \text{ K}$$

$$n = 1 \text{ mol}$$

$$R = \frac{PV}{nT} = \frac{(1 \cancel{\text{bar}}) \left(\frac{1 \text{ atm}}{1.013 \cancel{\text{bar}}} \right) (22.4 \text{ L})}{(1 \text{ mol}) (273.15 \text{ K})}$$

$$\approx \frac{0.082 \text{ atm L}}{\text{mol K}}$$

Equivalente
mecánico de calor (q)

$$1 \text{ cal} = 4.186 \text{ J}$$

$$R = \left(\frac{8.314 \text{ J}}{\text{mol K}} \right) \left(\frac{1 \text{ cal}}{4.186 \text{ J}} \right)$$

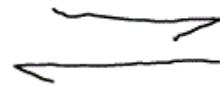
$$= 1.9861 \frac{\text{cal}}{\text{mol K}} \approx 1.9886$$

w { macroscópico }
 q { microscópico } } Funciones
de
trayectoria

proceso

termodinámico

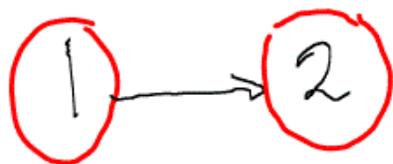
Reversible : multipasos



Irreversible un paso



Proceso
termodinámico



dq dw

X

q, w diferenciales
Inexactas

δq δw

dq dw

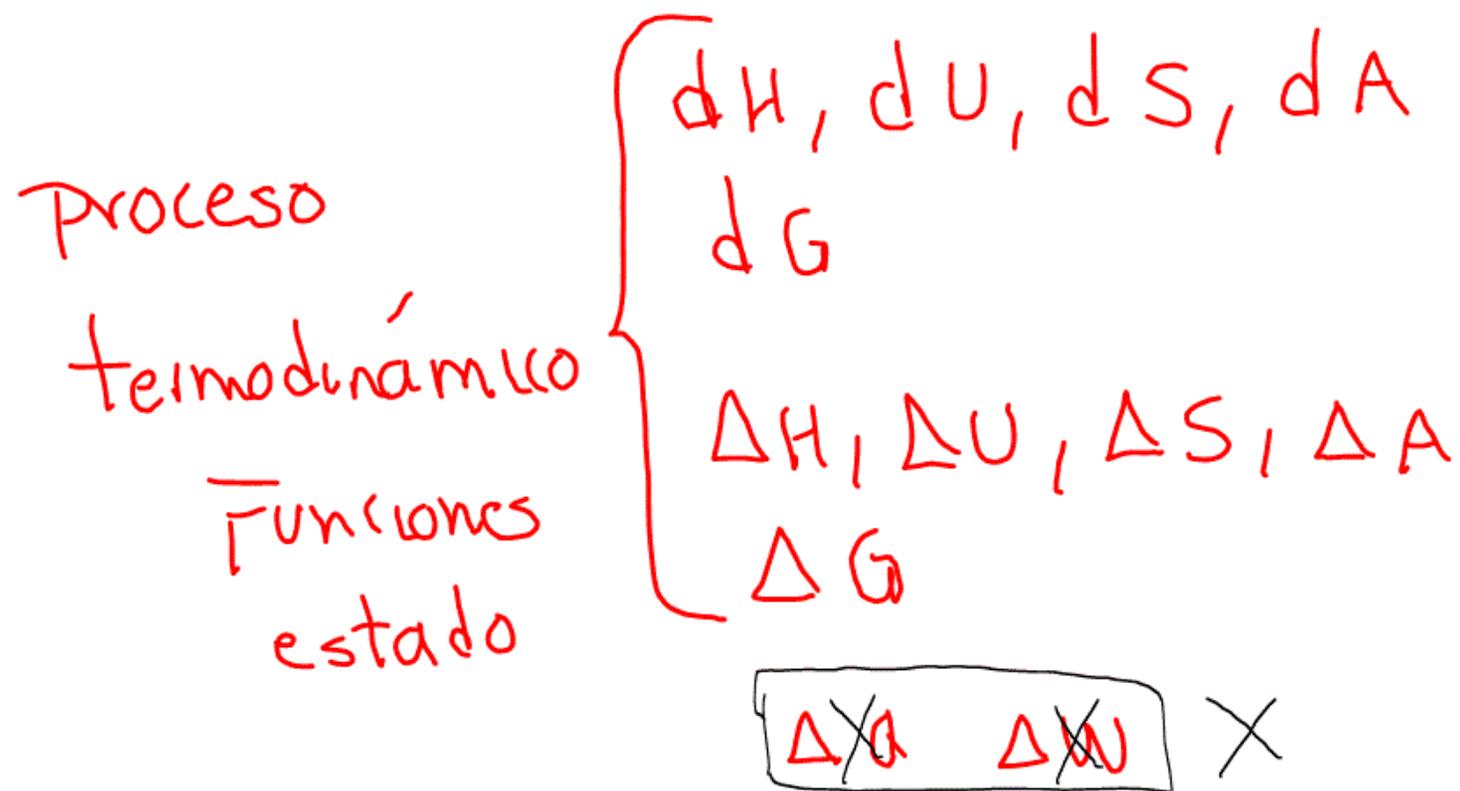
Funciones
de
estado

U, H, S, A

G

diferenciales
exactas

dependen de la
diferencial de la condición final
y la condición inicial



Ley I

Termodinámica

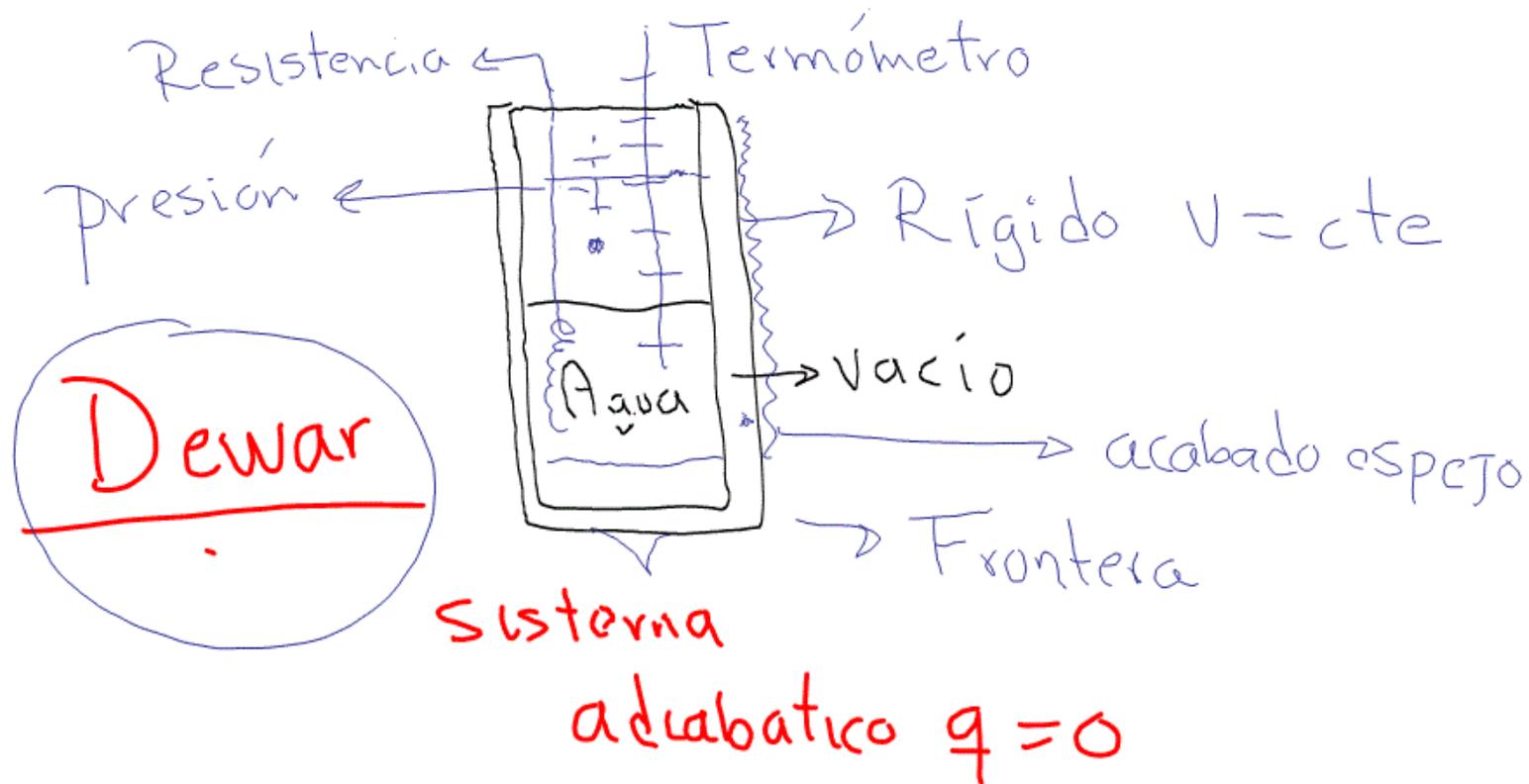
Energía

Interna U

$\sum_{i=1}^n$ (Energías del sistema)

$$\boxed{\Delta U} = \Delta \varepsilon_p, \Delta \varepsilon_c, \Delta \varepsilon_q, \Delta \varepsilon_R, \Delta \varepsilon_T, \Delta \varepsilon_V$$

\checkmark = untouchable



$$\Delta U \propto \Delta T$$

$$\overline{\Delta U} = C_v \Delta T$$

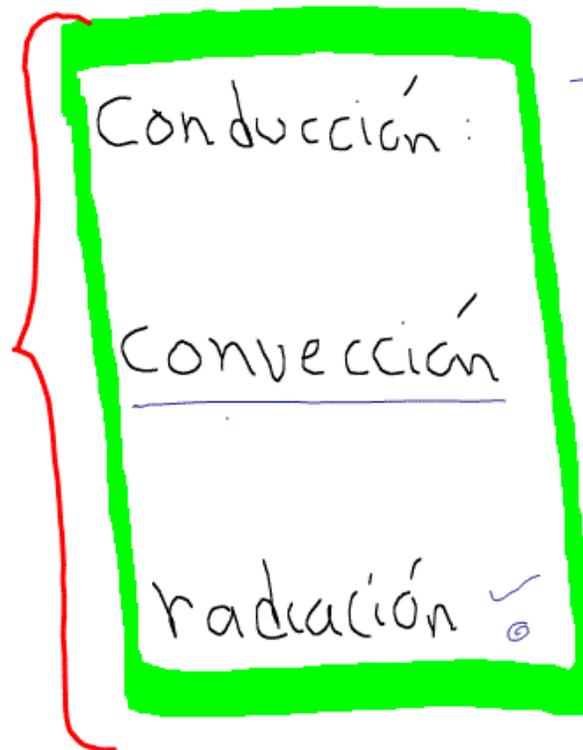
$$\overline{\Delta U} = \frac{\text{cal}}{\text{mol} \cdot \text{K}}$$

intensiva

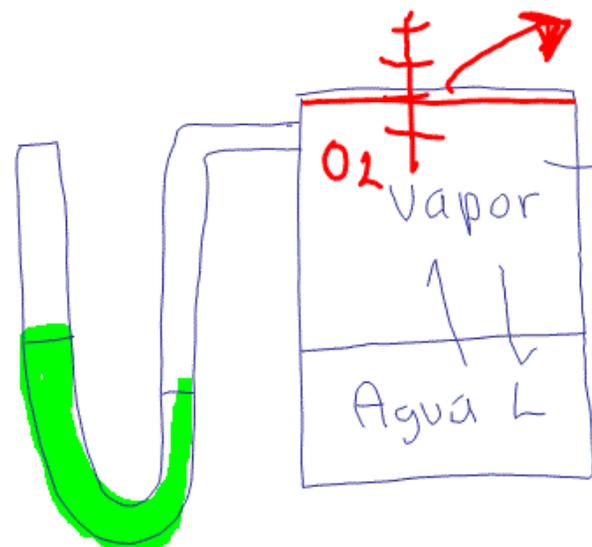
Capacidad
calorífica
a volumen
constante

$$= \frac{\text{cal}}{\text{mol}}$$

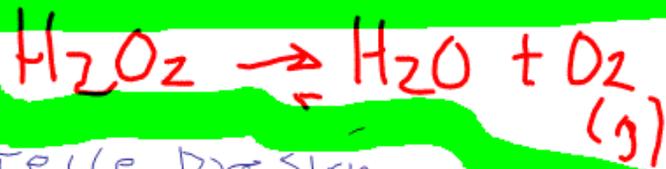
Calorímetro
transmisión
del
calor



Ley de
Newton
Ley de
Fourier
Ley de
Planck

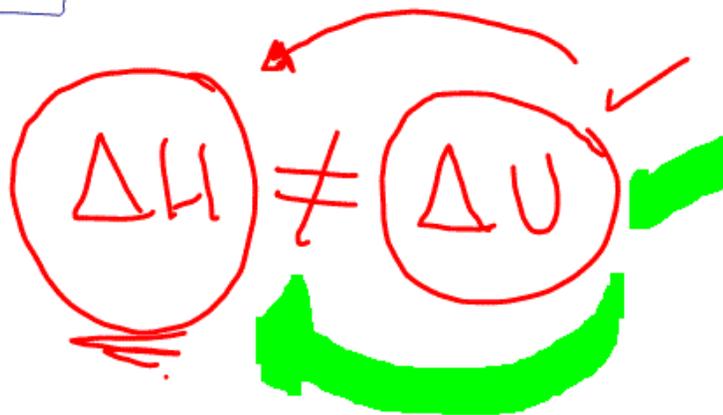


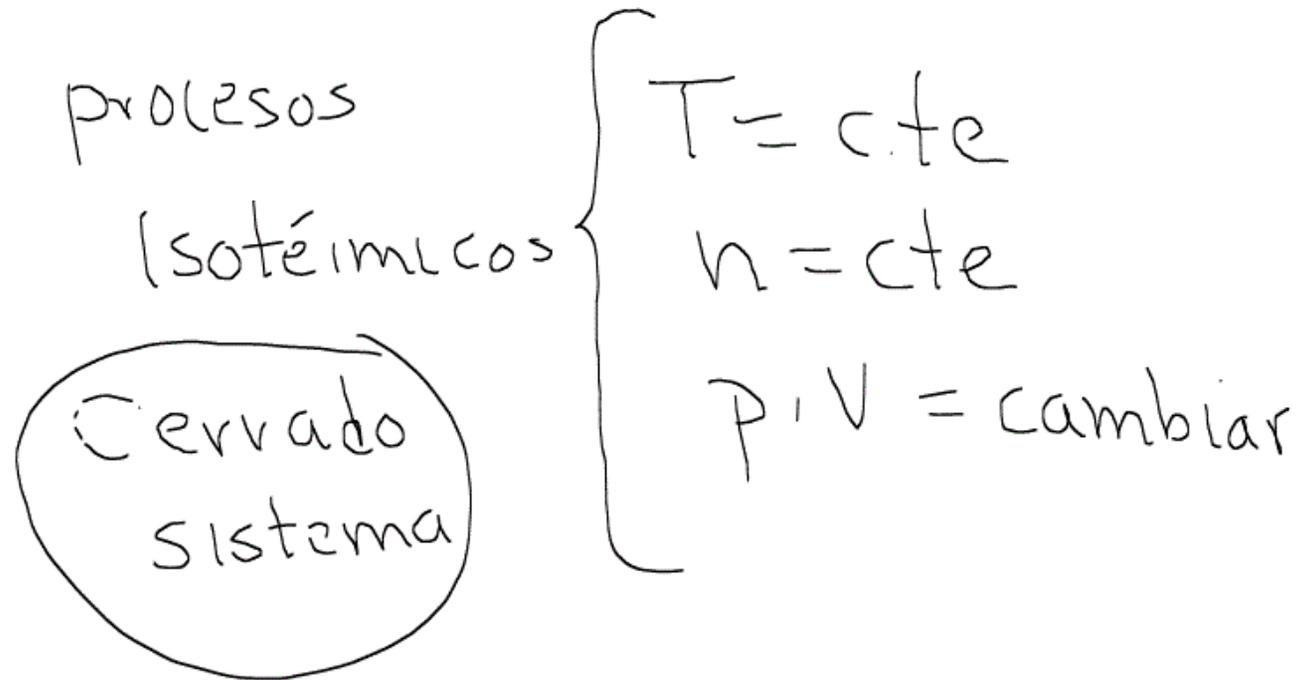
manometro



ejerice presión

$p = \text{no es constante}$





$$pV^X = \text{cte} \quad X = \text{pendiente}$$

$$X = 0$$

proceso
isobárico

$$pV^0 = \text{cte}$$

$$p = \text{cte}$$

$$\chi = 1$$

$$pV^{\gamma} = \text{cte}$$

$pV =$ proceso es
isotérmico

$$\gamma = \infty$$

$$PV^\infty = \text{cte}$$

isocórico

o

isométrico

$$[pV^x = \text{cte}] \ln$$

$$\ln p + x \ln v = \ln \text{cte}$$

$$\ln p = \ln \text{cte} - \textcircled{x} \ln v$$

