

$$dH = Tds + VdP$$

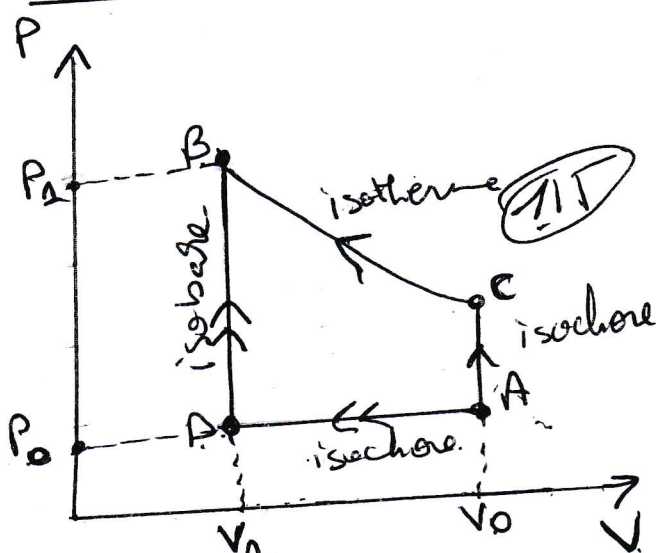
$$\Rightarrow ds = \frac{dH}{T} - \frac{V}{T} dP$$

$$= n c_p \frac{dT}{T} - \frac{nR}{P} dP$$

$$n = 1$$

$$ds = c_p \frac{dT}{T} - R \frac{dP}{P}$$

Exercice 1 (6 pts)



A  $(P_0, V_0, T_0)$  B  $(P_2, V_2, T_2)$

- AC  $\rightarrow$  isochore
  - CB  $\rightarrow$  Compression isotherme
  - AB  $\rightarrow$  Compression isobare
  - AD  $\rightarrow$  isochore
  - DB  $\rightarrow$  isotherme
- $P_2 = 4P_0$   
 $c_1 = \frac{5}{2}R$   
 $V_0 = 2V_A$   
 $c_p = \frac{7}{2}R$

$T_c = T_B = T_2$  (isotherme)

on a:

$$\frac{P_0 V_0}{T_0} = \frac{P_2 V_2}{T_2} = \frac{P_2 V_2}{T_0} = \frac{P_2 V_2}{T_0}$$

$$\frac{P_0 V_0}{T_0} = \frac{P_2 V_2}{T_2}$$

$$\Rightarrow T_2 = \frac{P_2 V_2}{P_0 V_0} \cdot T_0 = \frac{4 P_0 V_0}{2 P_0 V_0} = 2 T_0$$

$$T_2 = T_c = 2 T_0$$

$T_A$  ?

on a:

$$\frac{P_0 V_0}{T_0} = \frac{P_0 V_A}{T_A} \Rightarrow T_A = \frac{P_0 V_0 T_0}{P_0 V_A}$$

$$T_A = \frac{P_0 V_0}{2 P_0 V_0} \cdot T_0 = \frac{T_0}{2}$$

$$T_A = \frac{T_0}{2}$$

$$Q_{ACB} = Q_{AC} + Q_{CB}$$

$$Q_{AC} = n c_v (T_c - T_A)$$

$$= n c_v (2 T_0 - \frac{T_0}{2})$$

$$= n c_v T_0 = 4 \cdot \frac{5}{2} \cdot R T_0$$

$$Q_{AC} = 10 R T_0$$

$$Q_{CB} = -W_{CB} \text{ car}$$

$$\Delta U_{CB} = Q_{CB} + W_{CB} = 0 \text{ (isotherme)}$$

$$W_{CB} = - \int_C^B P dV = - n R T_2 \int_C^B \frac{dV}{V}$$

