

EX. 1:

He : GAZ MONOATOMIQUE \rightarrow G.P.

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INITIALEMENT: T_A, V_A

T. QUASI-STATIQUE ISOTHERME : $V_A \rightarrow V_B = 2V_A$
[RÉVERSIBLE]

T. " " ADIABATIQUE : $P_B \rightarrow P_C = P_A$
[RÉVERSIBLE]

Q1) $c_v = \frac{3}{2} R \Rightarrow \gamma = \frac{c_p}{c_v} = \frac{c_v + R}{c_v} = 1 + \frac{R}{c_v} = 1 + \frac{R}{\frac{3}{2} R} = \frac{5}{3}$

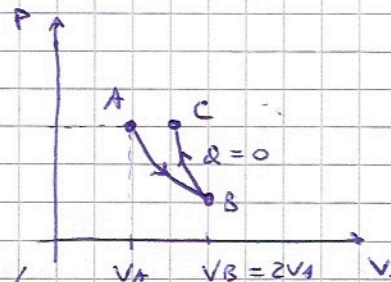
Q2) ISOTH.:

$V_B = 2V_A$

$T_B = T_A$

$P_B = \frac{mRT_B}{V_B} = \frac{mRT_A}{2V_A} = \frac{P_A}{2}$

↑
éq. état



Q3) ADIAB.:

$P_C = P_A$

$PV^\gamma = \text{const} \Rightarrow P_C V_C^\gamma = P_B V_B^\gamma \Rightarrow V_C = V_B \left(\frac{P_B}{P_C} \right)^{\frac{1}{\gamma}} = 2V_A \left(\frac{1}{2} \right)^{3/5}$

$T_C = \frac{P_C V_C}{mR} = \frac{P_A 2V_A (1/2)^{3/5}}{mR} = 2 \left(\frac{1}{2} \right)^{3/5} T_A$

↑
éq. état

Q4) $W = W_{AB} + W_{BC}$

$Q = Q_{AB} + Q_{BC} = Q_{AB}$

0 (ADIAB.)

ISOTH.: $\Delta U_{AB} = m c_v \Delta T_{AB} = 0 \quad (T_B = T_A) \Rightarrow$

$\Rightarrow Q_{AB} = -W_{AB}; W_{AB} = - \int_{V_A}^{V_B} p dV = - m R T_A \int_{V_A}^{V_B} \frac{1}{V} dV =$

$= - m R T_A \ln \left(\frac{V_B}{V_A} \right) = - m R T_A \ln 2$

