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PROBLEMA Nº5, MODELO A, PRÁCTICO ARAGÓN 2015

APARTADO C) $dS = dS_A + dS_B = \frac{\delta Q_A}{T} + \frac{\delta Q_B}{T}$ (0 adiabática, 0) }

$dU_A = \delta Q_A - \delta W_A = \delta Q_A - p\,dV \;;\; \delta Q_A = dU_A + p\,dV$

$\therefore dS_A = dS = \frac{dU_A}{T} + \frac{p}{T}dV = nC_V\frac{dT}{T} + nR\frac{dV}{V}$

$\frac{p}{T} = \frac{nR}{V}$ (A) $\quad C_p - C_V = R \;;\; \gamma - 1 = \frac{R}{C_V} \;;\; nC_V = \frac{nR}{\gamma-1}$

$\Delta S = \Delta S_A = \frac{nR}{\gamma-1}\int_{T_1}^{T_{2A}}\frac{dT}{T} + nR\int_{V_1}^{V_{2A}}\frac{dV}{V}$ }

$P_1V_1 = nRT_1 \rightarrow nR = \frac{P_1V_1}{T_1}$

$\Delta S_A = \Delta S = \frac{P_1V_1}{T_1(\gamma-1)}\left(\ln\frac{T_{2A}}{T_1} + (\gamma-1)\ln\frac{V_{2A}}{V_1}\right) =$

$= \frac{P_1V_1}{T_1(\gamma-1)}\left[\ln\left(6-3^{\frac{\gamma-1}{\gamma}}\right) + (\gamma-1)\ln\left(\frac{10-V_1/3^{1/\gamma}}{V_1}\right)\right] =$

$= \frac{P_1V_1}{T_1(\gamma-1)}\left[\ln\left(6-3^{\frac{\gamma-1}{\gamma}}\right) + (\gamma-1)\ln\left(\frac{10}{V_1} - \frac{1}{3^{1/\gamma}}\right)\right] =$

$= \frac{\frac{710}{760}\cdot 5\cdot 101325\cdot 10^{-3}}{300{,}15\,(1{,}4-1)}\left[\ln\left(6-3^{\frac{0{,}4}{1{,}4}}\right) + 0{,}4\cdot\ln\left(\frac{10}{5} - \frac{1}{3^{1/1{,}4}}\right)\right]$

$\Delta S_A = \boxed{\Delta S = 6{,}73\ \frac{J}{K}}$