1er Parcial

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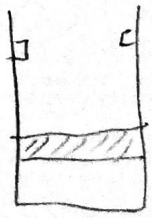
Ing. Electromecánica

(3)



$V_1 = 100\,[lt] \cdot \frac{0.001\,m^3}{1\,lt}$ | $P_2 = 685\,[kPa]$

$V_{max} = 220\,[lt] \cdot \frac{0.001}{1}$

Agua

$m = 0.5\,[kg]$

$m_\epsilon = 100\,[kg]$

$A_\epsilon = 53.5\,[cm^2] \cdot \frac{1}{100}$

$P_{BT} = 1.2\,[kg/cm^2]$

$P_1 = P_e + P_{atm}$

$= \frac{m_\epsilon g}{A} + P_{atm}$

$= \frac{100(9.8)}{5.35\times10^{-3}} \cdot \frac{1\,[kPa]}{1000\,[Pa]} + 1.2\,\left[\frac{kgf}{cm^2}\right] \cdot \frac{100^2\,cm^2}{1\,m^2} \cdot \frac{9.80665\,N}{1\,kgf} \cdot \frac{1\,[kPa]}{1000[Pa]}$

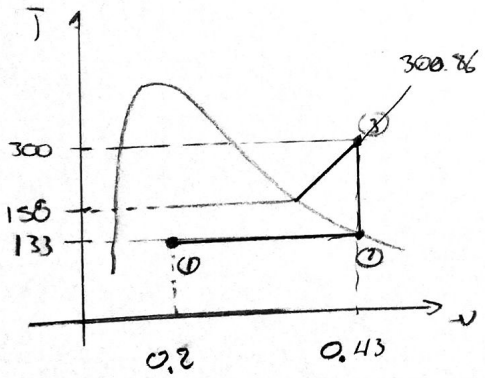
$P_1 = 183.177 + 117.6798 = 300.857\,[kPa]$

$v = \frac{V}{m} = \frac{0.1}{0.5} = 0.2$

$P(300) \rightsquigarrow \begin{cases} T = 133.55 \\ v_L = 0.001073 \\ v_V = 0.60582 \\ u_L = 561.13 \\ u_V = 2543.55 \end{cases}$

$x = \frac{v_1 - v_L}{v_V - v_L} = 0.3289$

$u_1 = 1213.23\,[kJ/kg]$



Estado 2

$v = \frac{V}{m} = \frac{0.22}{0.5} = 0.44$

$P(600\,[kPa]) \rightsquigarrow \begin{cases} T = 300°C \\ v = 0.43437 \\ u = 2801.00 \end{cases}$

$v < 0.44$

Trabajo:

$$_1W_3 = P_2 (V_2 - V_1)$$

$$_1W_3 = 300.857 \ (0.22 - 0.1)$$

$$= 36.10284 \ [kJ]$$

Calor

$$Q = m(u_3 - u_1) + W$$

$$= 0.5 \ (2801.00 - 1213.23) + 36.10284$$

$$\boxed{Q = 829.98784 \ [kJ]}$$