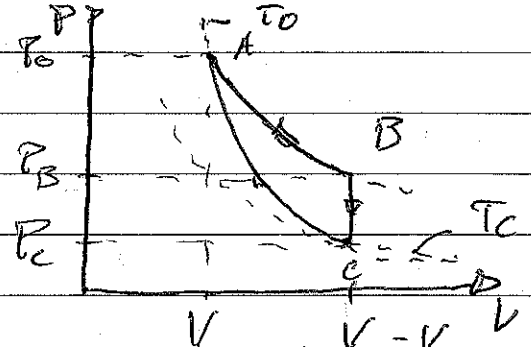
EXAMEN FÍSICA 2 - SOLUCIÓN | 17 | 02 | 2020

1| a) $m = \frac{P_0 V_0 M}{T_0 R}$

b) $P_B = P_0/5$; $P_C = P_0/5^{\gamma}$; $T_C = 5^{(1-\gamma)} T_0$

$= 20,26\ kPa$; $= 10,64\ kPa$; $= 156,5\ K$



c) $W_{AB} = -nRT_0 \ln \frac{V_B}{V_A}$

$= -489,1\ J$

$Q_{AB} = -W_{AB}$

$W_{BC} = 0$ $Q_{BC} = nC_V(T_C - T_B) = -360,65\ J$

$W_{CA} = \frac{nR}{\gamma - 1}(T_A - T_C) = 360,65\ J$; $Q_{CA} = 0$

d) Maq. Térmica ; $\eta = 1 - \frac{|Q_L|}{|Q_H|} = 1 - \frac{|Q_{BC}|}{Q_{AB}} = 0,26$

$\eta_{Carnot} = 1 - \frac{T_C}{T_0} = 0,48$

e) $\Delta S_U = \Delta S_{AB} + \Delta S_{amb} + \Delta S_{BC} + \Delta S_R$

$\Delta S_{AB} = -\Delta S_{amb}$; $\Delta S_{BC} = n\frac{5}{2}R \ln \frac{T_C}{T_B} = -1,64\ J/K$

$\Delta S_R = -\frac{Q_{BC}}{T_C} = 2,3\ J/K$ $\Delta S_U = 0,66\ J/K$

2| a) $v_s = \left(\frac{D}{d}\right)^2 v = 40\ m/s$

b) $P_b = P_0 + \frac{\rho}{2}(v_s^2 - v^2) + \rho_{Hg} g (h_1 - h_2) =$

$P_b = 106,1\ kPa$; $n = \frac{P_b V_b}{RT_0} =$ 0,04 moles

Rayos

c) $P_b' = P_0 + \frac{\rho}{2}(v_s^2 - v^2) + \rho_{ag} g h_1$

$P_b' = 109,1\ kPa \Rightarrow T' = \frac{P_b' V_b}{nR} = 306,3\ K$

3] a) $f_1 = 480\ Hz \quad \lambda_1 = \frac{v_{som}}{f_1} = 71,5\ cm$

b) $f_2 = f_1 \frac{(1 - v_P/v_{som})}{1 - v_1/v_{som}} = 494,6\ Hz$

c) Se forman batidas, no se forma onda estacionaria. $\Delta f = |f_2' - f_1'|^* = 14,5\ Hz$

d) $I[dB] = 10 \log_{10} \frac{I}{I_0} \Rightarrow I = 3,2\ mW/m^2$

$I = \frac{\bar{P}}{4\pi r^2} \Rightarrow \boxed{\bar{P} = 99,8\ W}$

* $f_2' = \frac{f_2}{1 + \frac{v_P}{v_{som}}} = 487,5\ Hz \quad f_1' = \frac{f_1}{1 - \frac{v_1}{v_{som}}} = 502,0\ Hz$

Papiros