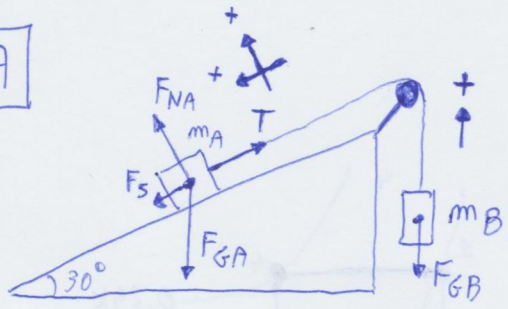
FISICA 1 - 01/07/2013

21/09/2013

A



$m_A = 4\,Kg$
$m_B = 3\,Kg$

$|F_{GA}| = m_A \cdot g = 4 \cdot 9{,}81 = |39{,}24|\,N$

$F_{NA} = F_{GA} \cos 30 = 33{,}98\,N$

$F_S = F_{GA} \sin 30 = 19{,}62\,N$

$T = F_{GB} = m_B \cdot g = 3 \cdot (-9{,}81) = -29{,}43\,N$

$F_{Netta} = F_S + T = 19{,}62 - 29{,}43 = -9{,}81\,N$

$a_{Netta} = \frac{F_{Netta}}{m_A + m_B} = \frac{-9{,}81}{4+3} = -1{,}40\,m/s^2$

Il sistema si muove. A sale verso la cima e B cade.

B $m = 1\,Kg$

$K = 4\,N/m^2$

$A = 3\,m$

$w = \sqrt{\frac{K}{m}} = \sqrt{\frac{4}{1}} = 2\ rad/s$

$x(t) = A\cos(wt + \varphi) = 3\cos(2t)$

$v(t) = -Aw\sin(wt + \varphi) = -6\sin(2t)$

$a(t) = -Aw^2\cos(wt + \varphi) = -12\cos(2t)$

$K(t) = \frac{1}{2}mv^2 = \frac{1}{2}(-6\sin(2t))^2 = 18\sin^2(2t)$

$U(t) = \frac{1}{2}Kx^2 = 2(3\cos(2t))^2 = 18\cos^2(2t)$

C

$P_1 = 1\ N/m^2$

$V_1 = 1\ m^3$

$T_1 = \frac{P_1 V_1}{nR} = \frac{1}{8,31} = 0,12\ K$ → (Isocora 1) ↵

$P_2 = 0,5\ N/m^2$

$V_2 = 1\ m^3$

$T_2 = \frac{P_2 V_2}{nR} = \frac{0,5}{8,31} = 0,06\ K$ → (Isobara 1) ↵

$P_3 = 0,5\ N/m^2$

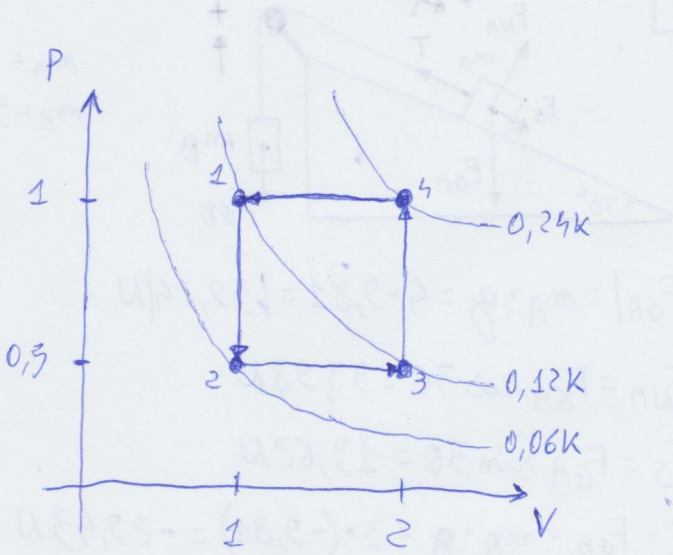
$V_3 = 2\ m^3$

$T_3 = \frac{P_3 V_3}{nR} = \frac{0,5 \cdot 2}{8,31} = 0,12\ K$ → (Isocora 2) ↵

$P_4 = 1\ N/m^2$

$V_4 = 2\ m^3$

$T_4 = \frac{P_4 V_4}{nR} = \frac{2}{8,31} = 0,24\ K$ → (Isobara 2)



Isocora 1:

$L = 0$

$Q = n c_V \Delta T = \frac{3}{2} R (T_2 - T_1) = \frac{3}{2} \cdot 8,31 \cdot (-0,06) = -0,75\ J$

Isobara 1:

$L = P \cdot \Delta V = P \cdot (V_2 - V_1) = 0,5 \cdot 1 = 0,5\ J$

$Q = n c_p \Delta T = \frac{5}{2} R (T_3 - T_2) = \frac{5}{2} \cdot 8,31 \cdot (0,06) = 1,25\ J$

Isocora 2:

$L = 0$

$Q = n c_V \Delta T = \frac{3}{2} R (T_4 - T_3) = \frac{3}{2} \cdot 8,31 \cdot (0,12) = 1,5\ J$

Isobara 2:

$L = P \cdot \Delta V = P \cdot (V_1 - V_4) = 1 \cdot (-1) = -1\ J$

$Q = n c_p \Delta T = \frac{5}{2} R (T_1 - T_4) = \frac{5}{2} \cdot 8,31 \cdot (-0,12) = -2,5\ J$

Totale:

$L_T = 0,5 - 1 = -0,5\ J$ (subisce lavoro)

$Q_T = -0,75 + 1,25 + 1,5 - 2,5 = -0,5$ (Rilascia calore)