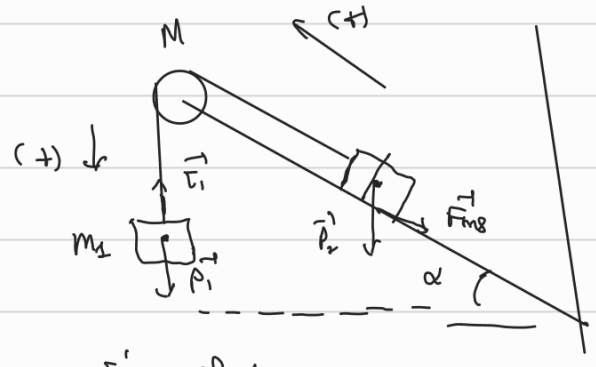
CKI 18-19 - HH1 - CA1

Câu 1:



a) Chọn mốc thế năng tại ròng rọc:

$$W = -m_1 g l_1 + \frac{1}{2} m_1 v_1^2 + \frac{1}{2} m_2 v_2^2 - m_2 g l_2 \sin\alpha$$

$$\Rightarrow -m_1 g a + m_1 v_1 a + m_2 v_2 a + m_2 g v_2 \sin\alpha = 0$$

$$\Rightarrow a = \frac{g m_1 - m_2 g \sin\alpha}{m_1 + m_2} \simeq 1,63 \ (m/s^2)$$

b)

b1)

$$g m_1 - T_1 = m_1 a$$

$$T_1 - T_2 = \frac{1}{2} M a$$

$$T_2 - m_2 g \sin\alpha - k m_2 g \cos\alpha = m_2 a$$

$$\Rightarrow a = \frac{g m_1 - m_2 g \sin\alpha - k m_2 g \cos\alpha}{m_1 + m_2 + \frac{M}{2}} \simeq 0,41 \ (m/s^2)$$

b2)

$$T_1 = g m_1 - m_1 a \simeq 37,56 \ (N)$$

$$T_2 = T_1 - \frac{1}{2} M a \simeq 37,15 \ (N)$$

Câu 2.

a)

$$T_2 = T_1 \left(\frac{V_1}{V_2}\right)^{\gamma - 1} = 600 \ (K)$$

$$T_3 = \frac{V_3}{V_2} T_2 \simeq 900 \ (K)$$

$$T_4 = T_3 \left(\frac{V_3}{V_4}\right)^{\gamma - 1} \simeq 529 \ (K)$$

b)

$$A' = Q_{23} + Q_{41} = n C_p (T_3 - T_2) + n C_V (T_4 - T_1) \simeq 9123,8 \ (J)$$

c)

$$H \simeq 45,47\%$$