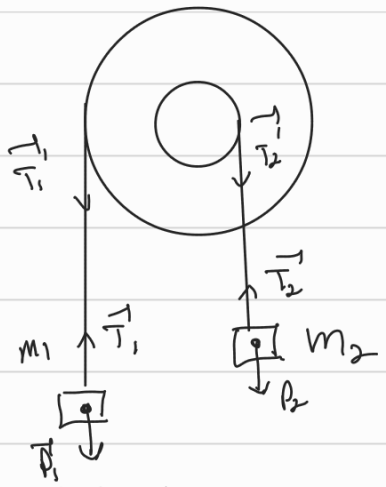
Bài 1: ĐỀ CK2 18 - 19



a)

$$gm_1 - T_1 = m_1 a_1 = m_1 r_1 \beta$$

$$T_2 - gm_2 = m_2 a_2 = m_2 r_2 \beta$$

$$T_1 \cdot r_1 - T_2 r_2 = I \cdot \beta$$

$$gm_1 r_1 - gm_2 r_2 = (m_1 r_1^2 + m_2 r_2^2 + I)\beta$$

$$\Rightarrow \beta = \frac{gm_1 r_1 - gm_2 r_2}{m_1 r_1^2 + m_2 r_2^2 + I} \simeq 2,76 \ (rad/s^2)$$

b)

$$T_1 = gm_1 - m_1 r_1 \beta \simeq 16,86 \ (N)$$

$$T_2 = gm_2 + m_2 r_2 \beta \simeq 18,6516 \ (N)$$

Câu 2:

a)

BTĐL $\quad m_1 v_1 + m_2 v_2 = m_1 v_1' + m_2 v_2'$

$$m_1 (v_1 - v_1') = m_2 (v_2' - v_2) \quad (1)$$

BT ĐN: $\quad \frac{1}{2} m_1 v_1^2 + \frac{1}{2} m_2 v_2^2 = \frac{1}{2} m_1 v_1'^2 + \frac{1}{2} m_2 v_2'^2$

$$m_1 (v_1^2 - v_1'^2) = m_2 (v_2'^2 - v_2^2) \quad (2)$$

$$\frac{(2)}{(1)} \quad v_1 + v_1' = v_2 + v_2' \quad (3)$$

$$(1) + m_1 (3) \Rightarrow 2m_1 v_1 = (m_1 + m_2) v_2' + (m_1 - m_2) v_2$$

$$\Rightarrow v_2' = \frac{2m_1 v_1}{m_1 + m_2} + \frac{m_2 - m_1}{m_1 + m_2} v_2 = 2,16 \ (m/s)$$

$$v_1' = -0,44 \ (m/s)$$

b)

BTĐL: $\quad m_1 v_1 + m_2 v_2 = (m_1 + m_2) v$

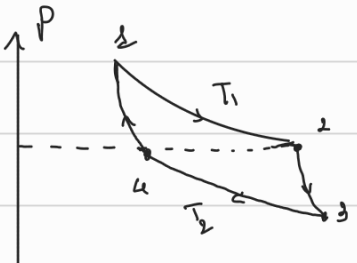
$$\Rightarrow v = 0,8 \ (m/s)$$

Nhiệt lượng tỏa ra ⊙ quá trình va chạm:

$$Q = W_1 - W_2 = \frac{1}{2} m_1 v_1^2 + \frac{1}{2} m_2 v_2^2 - \frac{1}{2} (m_1 + m_2) v^2 = 0,54 \ (J)$$

Câu 3:

a)



$$Q_{12} = nRT_1 \ln \frac{V_2}{V_1}$$

$$Q_{34} = nRT_2 \ln \frac{V_3}{V_4}$$

$$A' = Q_{12} + Q_{34} = nRT_1 \ln \frac{V_2}{V_1} - nRT_2 \ln \frac{V_3}{V_4} = nR(T_1 - T_2) \ln \frac{V_2}{V_1}$$

$$\begin{cases} p_1 V_1^{\gamma} = p_2 V_4^{\gamma} & p_2 V_2 = p_1 V_1 \\ p_2 V_2^{\gamma} = p_3 V_3^{\gamma} & p_4 V_4 = p_3 V_3 \end{cases}$$

$$\Rightarrow \frac{V_1}{V_2} = \frac{V_4}{V_3}$$

$$p_1 T_1^{\frac{\gamma}{1-\gamma}} V_1^{\frac{\gamma}{1-\gamma}} = p_4 T_2^{\frac{\gamma}{1-\gamma}} V_3^{\frac{\gamma}{1-\gamma}}$$

$$\frac{p_2 V_2}{V_1} T_1^{\frac{\gamma}{1-\gamma}} = p_4 T_2^{\frac{\gamma}{1-\gamma}}$$

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

$$\Rightarrow A' = nR(T_1 - T_2) \ln \left(\frac{T_2}{T_1}\right)^{\frac{\gamma}{1-\gamma}}$$

$$\Rightarrow \mathcal{P} = \frac{A'}{t} \simeq 63418{,}84 \, (W)$$