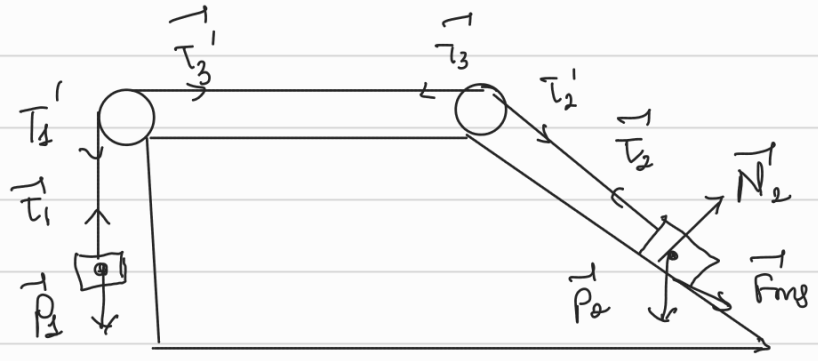
ĐỀ CK 2022 - 2023 - HỆ I - CA 2

Câu 1:



$$gm_1 - T_1 = m_1 a$$
$$T_1 - T_3 = \frac{1}{2} M a$$
$$T_3 - T_2 = \frac{1}{2} M a$$
$$T_2 - gm_2 \sin\alpha - \mu g m_2 \cos\alpha = m_2 a$$
$$\Rightarrow a = \frac{g m_1 - g m_2 \sin\alpha - \mu g m_2 \cos\alpha}{m_2 + m_1 + M} \simeq 3,25 \ (m/s^2)$$

b)

$T_1 \simeq 45,8 \ (N)$

$T_2 \simeq 42,54 \ (N)$

$T_3 \simeq 44,17 \ (N)$

c)

$$W_t = \frac{1}{2}(m_1 + m_2) v_1^2 + \frac{2}{2^2}\frac{1}{2} M R^2 . \omega^2$$
$$= \frac{1}{2}(m_1 + m_2 + M) v_1^2 \simeq 232,88 \ (J)$$

Câu 3:

a) Bảo toàn cơ năng:

$$\frac{1}{2} m v_B^2 - mgL\cos\alpha = 0$$
$$\Rightarrow v_B = \sqrt{2gL\cos\alpha} = 4,2 \ (m/s)$$

b)

$$v_C = \sqrt{2gL} = \frac{2\sqrt{2}}{5} \ (m/s)$$

$$\Rightarrow v_C' = \frac{m v_C}{m + M} = 3\sqrt{2} \ (m/s)$$

c)

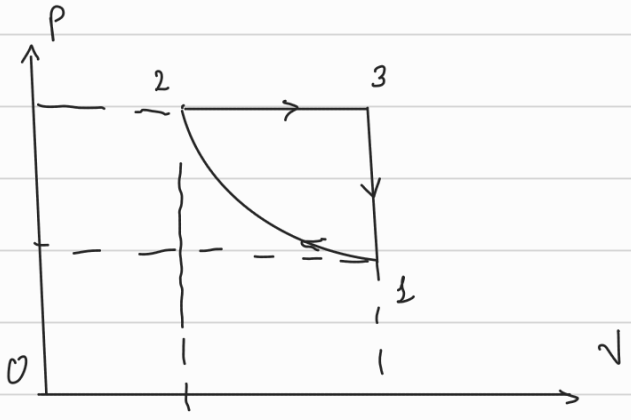
$$\frac{1}{2}(m+M)v_c^2 - (m+M)gr = -(m+M)gr\cos\beta$$

$$\Rightarrow \cos\beta = 1 - \frac{v_c^2}{2gr} = -\frac{26}{49}$$

$$h = 0,6 - 0,6\cdot\left(-\frac{26}{49}\right) \simeq \frac{45}{49} \simeq 0,92(m)$$

Câu 4:

a)



b)

$$Q_{12} = 0$$

$$Q_{23} = \frac{7}{2}nR(T_2 - T_2) \simeq 831445,98\ (J)$$

$$Q_{31} = \frac{5}{2}nR(T_1 - T_3) \simeq -668126,234\ (J)$$

c)

$$A' = Q_{31} + Q_{23} \simeq 163319,75\ (J)$$

d) $H \simeq 19,64\%$