

$$v_A = 20 \text{ m/s} \quad E_{\text{TOT}A} = E_{\text{TOT}B} = E_{\text{TOT}C}$$

$$v_B = ? \quad E_{\text{TOT}A} = \frac{1}{2} m v_A^2 = 40 \text{ kJ} = 40000 \text{ J}$$

$$\text{I) } E_{\text{TOT}B} = E_{\text{TOT}A} = \frac{1}{2} m v_B^2 + m \cdot g \cdot R$$

$\underbrace{40000}$
 \uparrow VARIABILE UNICA

$$\text{II) } E_{\text{TOT}C} = E_{\text{TOT}A} = \frac{1}{2} m v_C^2 + m \cdot g \cdot 2R$$

$\underbrace{40000}$
 \uparrow VARIABILE UNICA
 EQ. FORZE LUNGO \vec{u}_r

Ricavo le velocità

$v_A = 20 \text{ m/s}$

$$E_{\text{TOT}B} = E_{\text{TOT}A} = E_{\text{TOT}C}$$

$$E_{\text{TOT}B} = \frac{1}{2} m v_B^2 + m \cdot g \cdot R$$

$$40000 = \frac{1}{2} \cdot 200 \cdot v_B^2 + 200 \cdot 9,81 \cdot 5$$

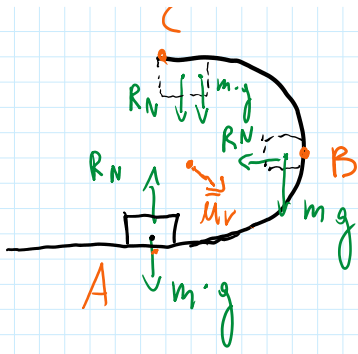
$$\leadsto v_B^2 = 302,76 \leadsto v_B = \underline{17,4 \text{ m/s}}$$

$$E_{\text{TOT}C} = \frac{1}{2} m v_C^2 + m \cdot g \cdot 2R$$

$$40000 = \frac{1}{2} \cdot 200 \cdot v_C^2 + 200 \cdot 9,81 \cdot 10$$

$$\leadsto v_C = \underline{14,3 \text{ m/s}}$$

Calcolo R_N reazione vincolare sulla guida



A) $R_{N_A} = m \cdot g$

B) $R_{N_B} = m \cdot a$

C) $R_{N_C} + m \cdot g = m \cdot a$

$a = \frac{v^2}{R}$

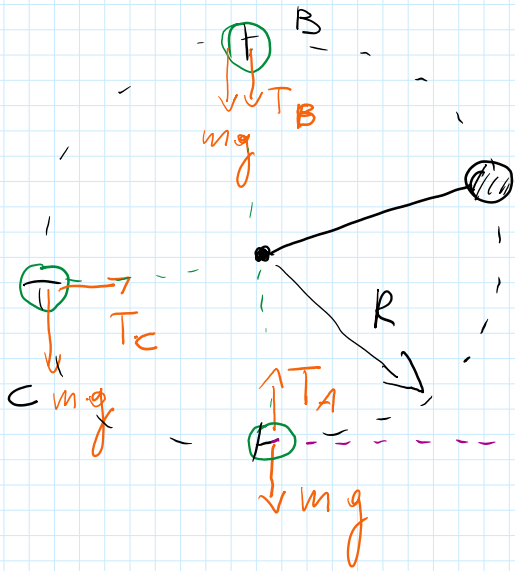
$R_{N_A} = 200 \cdot 9,81 = 1962 \text{ N}$

$R_{N_B} = 200 \cdot \frac{17,4^2}{5} = 12110 \text{ N}$

$R_{N_C} = 200 \left(\frac{19,3^2}{5} - 9,81 \right) = 6200 \text{ N}$

(Nota che $R_{N_B} > R_{N_C} > R_{N_A}$ che ha senso)

4,37



$m = 2 \text{ Kg}$

$R = ?$

$T_A = 137,2 \text{ N}$

$v_B = 4,73 \text{ m/s}$

Punto A)

$\sum F_y = m \cdot a_y \leadsto m \cdot g - T_A = m \frac{v_A^2}{R}$

2 incognite

1 eq, me ne

Ora considero energia

← serve un'altra

$E_{M_A} = E_{M_B} = E_{M_C}$

$$E_{MA} = E_{MB} = E_{MC}$$

$$E_{MB} = \frac{1}{2} m v_B^2 + m \cdot g \cdot 2R = E_{MA} = \frac{1}{2} m v_A^2$$

$$\leadsto \frac{1}{2} m v_B^2 + m \cdot g \cdot 2R = \frac{1}{2} m v_A^2$$

$$\leadsto v_A^2 = v_B^2 - 4g \cdot R$$

$$\sum F_y = m a_y \leadsto m \cdot g - T_A = m \frac{v_A^2}{R}$$

$$\leadsto m \cdot g - T_A = \frac{m}{R} (v_B^2 - 4gR)$$

$$\leadsto 2 \cdot 9,81 - 137,2 = \frac{2 \cdot 22,37 - 4 \cdot 9,81 \cdot 2}{R}$$

$$\leadsto R = 1,14 \text{ m}$$

$$\text{Ora } E_{MC} = E_{MB} = \frac{1}{2} m v_B^2 + m \cdot g \cdot 2R \approx 67 \text{ J}$$

$$E_{MC} = \frac{1}{2} m v_C^2 + m \cdot g \cdot R$$

$$\leadsto 67 = \frac{2 \cdot v_C^2}{2} + 2 \cdot 9,81 \cdot 1,14 \leadsto v_C = 44,63 \left(\frac{\text{m}}{\text{s}} \right)$$

$$\sum F_x = m a_x \quad \text{in C}$$

$$T_C = \frac{m v_C^2}{R} = \frac{2 \cdot 44,63^2}{1,14} = 79,7 \text{ N}$$