

Unitat 4. Conservació de la quantitat de moviment

pàg. 160-165

① canó $\vec{p} = m_1 \vec{v}$ si $\vec{p}$ és igual $\frac{\vec{p}}{\vec{p}} = \frac{m_1 \vec{v}}{3m_2 \vec{v}}$
 automòbil $\vec{p} = m_2 3\vec{v}$

$$[m_1 = 3m_2]$$

La massa del canó és
3 vegades més gran

② $m = 275 \text{ Kg}$

$$v = \frac{65 \text{ km}}{\text{h}} \cdot \frac{10^3 \text{ m}}{1 \text{ km}} \cdot \frac{1 \text{ h}}{3600 \text{ s}} = 18,06 \text{ m/s}$$

$$\vec{p} = m \cdot \vec{v} = 275 \text{ Kg} \cdot 18,06 \text{ m/s} = [4965,28 \text{ Kg} \cdot \text{m/s}]$$

③

$$v_0 = \frac{100 \text{ km}}{\text{h}} \cdot \frac{10^3 \text{ m}}{1 \text{ km}} \cdot \frac{1 \text{ h}}{3600 \text{ s}} = 27,78 \text{ m/s} \quad t = 1,5 \text{ s}$$

$$v = \frac{120 \text{ km}}{\text{h}} \cdot \frac{10^3 \text{ m}}{1 \text{ km}} \cdot \frac{1 \text{ h}}{3600 \text{ s}} = 33,33 \text{ m/s} \quad m = 180 \text{ Kg}$$

$$\Delta \vec{p} = m \vec{v} - m \vec{v}_0 = m (\vec{v} - \vec{v}_0) = 180 (33,33 - 27,78) = 1000 \text{ Kg} \cdot \text{m/s}$$

$$F = \frac{\Delta \vec{p}}{\Delta t} = \frac{1000 \cdot \text{Kg} \cdot \text{m/s}}{1,5 \text{ s}} = [667 \text{ N}]$$

④

$$m = 12 \text{ g} \cdot \frac{1 \text{ Kg}}{10^3 \text{ g}} = 0,012 \text{ Kg}$$

$$\Delta \vec{p} = \vec{p} - \vec{p}_0 = m (\vec{v} - \vec{v}_0) = 0,012 \cdot 15 = 0,18 \text{ Kg} \cdot \text{m/s}$$

$$v = 15 \text{ m/s}$$

$$v_0 = 0 \text{ m/s}$$

$$F = \frac{\Delta \vec{p}}{\Delta t} = \frac{0,18 \text{ Kg} \cdot \text{m/s}}{0,1 \text{ s}} = [1,8 \text{ N}]$$

⑤

$$v_0 = \frac{72 \text{ km}}{\text{h}} \cdot \frac{10^3 \text{ m}}{1 \text{ km}} \cdot \frac{1 \text{ h}}{3600 \text{ s}} = 20 \text{ m/s} \quad m = 70 \text{ Kg}$$

$$\Delta t = 0,25 \text{ s}$$

$$v = \frac{-18 \text{ km}}{\text{h}} \cdot \frac{10^3 \text{ m}}{1 \text{ km}} \cdot \frac{1 \text{ h}}{3600 \text{ s}} = -5 \text{ m/s}$$

$$F = \frac{\Delta p}{\Delta t} = \frac{m (\vec{v} - \vec{v}_0)}{\Delta t} = \frac{70 \cdot (-5 - 20)}{0,25} = [-7000 \text{ N}]$$

$$\Sigma F = m \cdot a \quad a = \frac{F}{m} = \frac{-7000}{70} = [-100 \text{ m/s}^2]$$

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$$F(t) = 96 - 800t$$

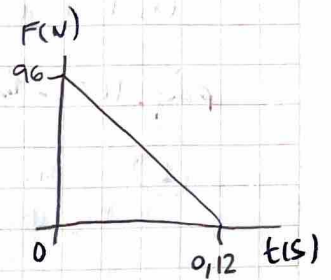
$$t_0 = 0s$$

$$t = 0,12s$$

$$96 - 800t = 0$$

$$t = \frac{96}{800} = 0,12s$$

$$I = \Delta p = \frac{b \cdot a}{2} = \frac{0,12 \cdot 96}{2} = [5,76 \text{ N} \cdot s]$$



$$I = \Delta p = m(\vec{v} - \vec{v}_0)$$

$$5,76 = 0,09(\vec{v} - 0)$$

$$v = \frac{5,76 \text{ N} \cdot s}{0,09 \text{ kg}} = [64 \text{ m/s}]$$

pàg. 171

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$$F_{0A} = 3 F_{0B}$$

$$I_A = \frac{F_{0A} \cdot t_A}{2}$$

$$I_B = \frac{F_{0B} \cdot t_B}{2}$$

$$t_{fA} = t_{fB}/2$$

$$I_A = m_A(v_A - v_{0A})$$

$$I_A = m_A v_A$$

$$I_B = m_B(v_B - v_{0B})$$

$$I_B = m_B v_B$$

$$m_A = 2m_B$$

$$\frac{3 F_{0B} \cdot t_{fB}/2}{2} = 2m_B v_A$$

$$\frac{F_{0B} \cdot t_{fB}}{2} = m_B v_B$$

$$\frac{\frac{3}{4} F_{0B} \cdot t_{fB}}{\frac{1}{2} F_{0B} \cdot t_{fB}} = \frac{2m_B v_A}{m_B v_B}$$

$$\frac{6}{4} = \frac{2v_A}{v_B}$$

$$3v_B = 4v_A$$

$$\left[v_A = \frac{3}{4} v_B \right]$$