PADRÃO DE RESPOSTAS

Questão	Resposta
1	$a_c = \frac{v^2}{R}$ $5 \cdot g = \frac{v^2}{R}$ $5 \cdot 10 = \frac{v^2}{128}$ $v^2 = 6400$ $v = 80$ m/s $v = 288$ km/h
2	160 GHz $= 160 \times 10^9$ Hz $3{,}0 \times 10^8 = \lambda \cdot 160 \times 10^9$ $\lambda = \frac{3{,}0 \times 10^8}{160 \times 10^9} = 0{,}001875 = 1{,}875 \times 10^{-3}$ m
3	$p = p'$ $p + p' = 5{,}6$ $2p = 5{,}6$ $p = 2{,}8$ $Y_L = Y_S - p$ $Y_L = 3{,}0 - 2{,}8 = 0{,}2 = 20$ cm
4	Velocidade de lançamento da bola (v_0): $t = 0{,}5$ s (tempo total) $t_s = 0{,}5 : 2 = 0{,}25$ s (tempo de subida) $v_y = v_0 - g \cdot t_s$ $v_y = 0$ (na altura máxima) $v_0 = g \cdot t_s = 10 \cdot 0{,}25 = 2{,}5$ m/s Deslocamento horizontal do carrinho (Δx): $v = 50$ cm/s (MRU: velocidade constante) $\Delta x = v \cdot t$ $\Delta x = 50 \cdot 0{,}5 = 25$ cm
5	v_A: 27 000 km/h = 7 500 m/s v_B: 36 000 km/h = 10 000 m/s $I = \Delta Q$ $I = m_B \cdot v_B - m_A \cdot v_A$ $I = 26\,000 \cdot 10\,000 - 26\,500 \cdot 7\,500$ $I = 2{,}6 \times 10^8 - 1{,}9875 \times 10^8$ $I = 6{,}125 \times 10^7 = 6{,}125 \times 10^4$ kN · s
6	$\Delta\theta = \theta_f - \theta_i = 35 - 15 = 20$ °C $m \cdot c \cdot \Delta\theta = P_{ot} \cdot \Delta t$ $\rho \cdot V = \frac{P_{ot} \cdot \Delta t}{c \cdot \Delta\theta}$ $V = \frac{P_{ot} \cdot \Delta t}{\rho \cdot c \cdot \Delta\theta}$ $V = \frac{6000 \cdot 4}{1 \cdot 4000 \cdot 20} = 0{,}3$ L

7	$T_0 = 47 + 273 = 320$ K $\frac{p \cdot V}{T} = \frac{p_0 \cdot V_0}{T_0}$, $p = p_0$ $\frac{V}{T} = \frac{V_0}{T_0}$ $\frac{4}{T} = \frac{2}{320}$ $T = 640$ K $T = 640 - 273 = 367$ °C
8	$F_R = m \cdot a$ $T - F_{at} - P_x = m \cdot a$ $T - \mu \cdot N - m \cdot g \cdot \text{sen}\,\theta = m \cdot a$ $T - \mu \cdot m \cdot g \cdot \cos\theta - m \cdot g \cdot \text{sen}\,\theta = m \cdot a$ $T - 1{,}2 \cdot 500 \cdot 10 \cdot 0{,}8 - 500 \cdot 10 \cdot 0{,}6 = 500 \cdot 1$ $T - 4800 - 3000 = 500$ $T = 4800 + 3000 + 500$ $T = 8300$ N
9	$p = p_{atm} + \rho \cdot g \cdot h$ $p_{atm} = 1{,}0 \times 10^5$ Pa $\rho \cdot g \cdot h = 1000 \cdot 10 \cdot 200 = 2{,}0 \times 10^6$ Pa $p = 2{,}1 \times 10^6$ Pa $A_{circular} = \pi \cdot R^2 = 3 \cdot (0{,}2)^2 = 1{,}2 \times 10^{-1}$ m^2 $p = \frac{F}{A} \rightarrow F = p \cdot A$ $F = 2{,}1 \times 10^6 \cdot 1{,}2 \times 10^{-1}$ $F = 2{,}52 \times 10^5$ N
10	$F_{el} = P$ $\frac{k \cdot \lvert q_1 \rvert \cdot \lvert q_2 \rvert}{d^2} = m \cdot g$ $\lvert q_2 \rvert = \frac{m \cdot g \cdot d^2}{k \cdot \lvert q_1 \rvert}$ $\lvert q_2 \rvert = \frac{2{,}0 \times 10^{-10} \cdot 10 \cdot (3{,}0 \times 10^{-3})^2}{9{,}0 \times 10^9 \cdot 25 \times 10^{-12}}$ $\lvert q_2 \rvert = \frac{2{,}0 \times 10^{-12}}{25}$ $\lvert q_2 \rvert = 0{,}08 \times 10^{-12} = 0{,}08$ pC $= 8{,}0 \times 10^{-2}$ pC