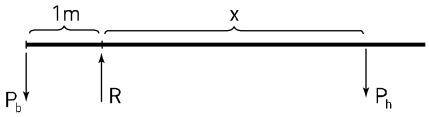
PADRÃO DE RESPOSTAS

(VALOR DE CADA QUESTÃO = 2 PONTOS)

Questão	Resposta
1	$P \propto m \propto V = LA$ $\frac{P_2}{P_1} = \frac{L_2 A_2}{L_1 A_1} = \frac{75}{25}\frac{A_2}{A_1} = 4 \quad \Rightarrow A_2 = \frac{4}{3}A_1$ $R \propto \frac{L}{A}$ $\frac{R_2}{R_1} = \left(\frac{L_2}{L_1}\right)\left(\frac{A_1}{A_2}\right) = 3 \times \frac{3}{4} \Rightarrow R_2 = 9\,\Omega$
2	 $P_b \times 1 = P_h \times X$ $X = \frac{p_b}{P_h} = \frac{350}{100} = 3{,}5\,m$
3	$\cos i = 0{,}6 \quad \Rightarrow \quad \text{sen}^2 i = 1 - \cos^2 i = 1 - 0{,}36 = 0{,}64 \quad \Rightarrow \quad \text{sen}\, i = 0{,}8$ $\frac{\text{sen}\, i}{\text{sen}\, r} = \frac{n_l}{n_{ar}} = 1{,}33 \quad \Rightarrow \text{sen}\, r = \frac{0{,}8}{1{,}33} = \frac{3}{4} \times 0{,}8 = 0{,}6 = \cos i \Rightarrow i + r = \frac{\pi}{2}$ $\Rightarrow r = 36{,}87^o$ $\text{sen}\, L = \frac{n_{ar}}{n_l} \quad \Rightarrow \text{sen}\, L = \frac{1}{1{,}33} = 0{,}75 \quad \Rightarrow L = 48{,}75^o$ $2\theta = L - r \quad \Rightarrow \theta = \frac{48{,}75 - 36{,}87}{2} = 5{,}94^o$
4	$T_0 = 273 + 16 = 289\,K$ $\frac{P_0 \times V_0}{T_0} = \frac{P_1 \times V_1}{T_1}$ $\frac{P_0 \times V_0}{T_0} = \frac{1{,}1P_0 \times 1{,}1V_0}{T_1} \Rightarrow \frac{P_0 \times V_0}{T_0} = \frac{1{,}21P_0 \times V_0}{T_1}$ $T_1 = 1{,}21T_0 \Rightarrow T_1 = 349{,}7K = 76{,}7\ ^oC$

5	$v = \omega r = \frac{2\pi}{T} r \quad T = 2 \times 10^8 \text{ anos} = 2 \times 3{,}14 \times 10^{15} \text{ s}$ $F_C = ma_C = \frac{mv^2}{r} = m\left(\frac{2\pi}{T}\right)^2 r$ $F_g = G\frac{Mm}{r^2} \qquad m = 2 \times 10^{30} \text{ kg}$ $F_g = F_c \quad \Rightarrow \quad \frac{GMm}{r^2} = \frac{m4\pi^2 r}{T^2} \quad \Rightarrow \quad N = \frac{M}{m} = \frac{4\pi^2 r^3}{GmT^2}$ $r = 3{,}0 \times 10^{20} \text{ m}$ $G = 6{,}7 \times 10^{-11} \text{ Nm}^2/\text{kg}^2$ $N = \frac{4 \times (3{,}14)^2 \times 3^3 \times 10^{60}}{6{,}7 \times 10^{-11} \times 2 \times 10^{30} \times 2^2 \times (3{,}14)^2 \times 10^{30}} = \frac{3^3}{2 \times 6{,}7} = \frac{27}{13{,}4} \times 10^{11} \cong 2 \times 10^{11}$ estrelas
6	$V_Y^2 = V_{0Y}^2 - 2gY = 0 \quad \Rightarrow \quad Y = H = \frac{V_{0Y}^2}{2g}$ $V_Y = V_{0Y} - gt$ $Y = Y_{MAX} = H \quad \Rightarrow \quad V_Y = 0 \quad \Rightarrow \quad t_S = \frac{V_{0Y}}{g}$ $X = V_{0X} t \quad \Rightarrow \quad \frac{A}{2} = V_{0X} t_s \quad \Rightarrow \quad A = \frac{2V_{0X}V_{0Y}}{g}$ $\frac{H}{A} = \frac{1}{4}\left(\frac{V_{0Y}}{V_{0X}}\right) = \frac{tg\theta}{4} \quad \Rightarrow \quad tg\theta = \frac{4H}{A} << 1 \quad \Rightarrow \theta \cong \frac{4H}{A} = 0{,}04 \text{rad} \approx 2{,}3^o$
7	$V = b \times h = 20 \times 2{,}5 = 50 \text{m}^3$ $Q = m \times c \times \Delta\theta \quad \Rightarrow Q = \rho \times V \times c \times \Delta\theta$ $Q = 1{,}25 \times 50 \times 10^3 \times 10 = 6{,}25 \times 10^5 \text{ J}$ $E = P \times t = 2Q$ $t = \frac{2Q}{P}$ $t = \frac{2 \times 6{,}25 \times 10^5}{2 \times 10^3} = 625 \text{ s} = 10{,}4 \text{ min}$

8	$R_{eq} = \frac{R}{2} + R = \frac{3R}{2}$ $i = \frac{U}{R_{eq}} = \frac{2U}{3R}$ $U_z = R \times i = \frac{2}{3}U$ $U_z = \frac{2 \times 12}{3} = 8\,V$
9	$d = V_0 t$ $t = \frac{0,3}{3.10^7} = 10^{-8}\,s = 10\,ns$
10	$Q_i = m_x \times V_0$ $Q_f = m_x \frac{V_0}{3} + m_y 4 \frac{V_0}{3}$ $Q_i = Q_f \Rightarrow m_x \times V_0 = m_x \frac{V_0}{3} + m_y 4 \frac{V_0}{3}$ $3\,m_x = m_x + 4\,m_y \Rightarrow 2m_x = 4m_y \Rightarrow \frac{m_x}{m_y} = 2$