

**PADRÃO DE RESPOSTAS**  
(VALOR POR QUESTÃO: 2,00 PONTOS)

Questão	Resposta
1	$A_1 = \Delta v \rightarrow \frac{1 \times 10}{2} \rightarrow \Delta v = 5 \text{ m/s}$ $A_2 = I = \Delta Q \rightarrow \frac{20 \times 10}{2} = 100 \text{ N.s}$ $\Delta Q = m \times \Delta v \rightarrow 100 = m \times 5 \rightarrow m = 20 \text{ kg}$
2	$T = E - P$ $T = \mu_{\text{Liq}} \times V_{\text{Liq}} \times g - m \times g$ $T = 10^3 \times 5,7 \times 10^{-3} \times 10 - 0,45 \times 10$ $T = 57 - 4,5 = 52,5 \text{ N}$
3	$f = 60 \text{ cm} \rightarrow \text{identificação desse ponto como ponto focal}$ $\frac{1}{f} = \frac{1}{p} + \frac{1}{p'} \rightarrow \frac{1}{60} = \frac{1}{180} + \frac{1}{p'}$ $\frac{1}{p'} = \frac{1}{60} - \frac{1}{180} = \frac{3-1}{180} = \frac{2}{180} \rightarrow p' = 90 \text{ cm}$
4	<p>Ondas de rádio.</p> $v = \lambda f \rightarrow \lambda = \frac{v}{f} = \frac{3 \times 10^8}{3 \times 10^6} = 1,0 \times 10^2 \text{ m}$
5	$P_{\text{ot}} = F_R \times v = m \times a \times v = \frac{P}{g} \times a \times v$ $132 \times 10^3 = \frac{2 \times 10^4}{10} \times a \times 20$ $a = \frac{132}{40} = 3,3 \text{ m/s}^2$
6	<p>Não.</p> $v = v_0 + a \times t \rightarrow 25 = 10 + a \times 5 \rightarrow a = 3 \text{ m/s}^2$ <p>Uma das justificativas:</p> <ul style="list-style-type: none"> <li><math>v^2 = v_0^2 + 2 \times a \times \Delta s \rightarrow 25^2 = 10^2 + 2 \times 3 \times \Delta s \rightarrow \Delta s = 87,5 \text{ m}</math></li> <li><math>s = s_0 + v_0 \times t + \frac{a \times t^2}{2} \rightarrow \Delta s = 10 \times 5 + \frac{3 \times 5^2}{2} \rightarrow \Delta s = 87,5 \text{ m}</math></li> </ul>
7	$A_1 = \tau_1 \rightarrow \frac{8 \times 2}{2} = 8 \text{ J}$ $A_2 = \tau_2 \rightarrow \frac{4 \times (-1)}{2} = -2 \text{ J}$ $\tau_{\text{Total}} = \tau_1 + \tau_2 = 8 + (-2) = 6 \text{ J}$
8	$F_E = F_R \rightarrow \frac{K \times q_1 \times q_2}{d^2} = m \times a$ $\frac{9 \times 10^9 \times 10^{-6} \times 10^{-6}}{1^2} = 10^{-3} \times a$ $a = \frac{9 \times 10^9 \times 10^{-6} \times 10^{-6}}{10^{-3}} = 9 \text{ m/s}^2$

9	$F_{\text{grav}} = F_c \rightarrow \frac{GMm}{R^2} = \frac{mv^2}{R} \rightarrow v = \sqrt{\frac{GM}{R}}$ $\frac{V_x}{V_y} = \sqrt{\frac{G \times M}{R_x} \times \frac{R_y}{G \times M}} = \sqrt{\frac{4R}{9R}} \rightarrow \frac{V_x}{V_y} = \frac{2}{3}$
10	$\Delta V_{\text{ap}} = V_0 \times \gamma_{\text{ap}} \times \Delta \theta$ $3,2 = 400 \times \gamma_{\text{ap}} \times 40 \rightarrow \gamma_{\text{ap}} = \frac{3,2}{400 \times 40} = 200 \times 10^{-6} \text{ } ^\circ\text{C}^{-1}$ $\gamma_{\text{liq}} = \gamma_{\text{ap}} + \gamma_{\text{rec}} \rightarrow \gamma_{\text{liq}} = 200 \times 10^{-6} + 36 \times 10^{-6} = 236 \times 10^{-6} \text{ } ^\circ\text{C}^{-1}$