

**PADRÃO DE RESPOSTAS**  
**(valor de cada questão = 2,0 pontos)**

Questão	Resposta
1	A) $F_R = m \times a$ $F_R = 50 \times 3,2$ $F_R = 160 \text{ N}$
	$I = F \times \Delta t$ $I = 160 \times 0,5$ $I = \mathbf{80 \text{ N.s}}$
	B) $V = V_0 + a \times t$ $V = 0 + 3,2 \times 0,5$ $V = 1,6 \text{ m/s}$  $E_C = \frac{1}{2} \times m \times v^2$ $E_C = \frac{1}{2} \times 50 \times (1,6)^2$ $E_C = \mathbf{64 \text{ J}}$
2	A) $d = \frac{m}{V}$
	$d = \frac{1.000}{1.250} = \mathbf{0,8 \text{ g/cm}^3}$
	B) $\tau = m \times g \times h$ $\tau = 16,26 \times 10 \times 1,5$  $\tau = \mathbf{243,9 \text{ J}}$
	A) $Q_1 = m \times c \times \Delta\theta$ $Q_1 = 150.000 \times 1,0 \times (+20) = 3.000 \text{ kcal}$  $Q_2 = L \times m$ $Q_2 = 80 \times 150.000 = 12.000 \text{ kcal}$  $Q_3 = m \times c \times \Delta\theta$ $Q_3 = 150.000 \times 0,5 \times (+3) = 225 \text{ kcal}$  $Q_T = Q_1 + Q_2 + Q_3$ $Q_T = (3.000 + 12.000 + 225) \times 10^3 \text{ cal}$ $Q_T = \mathbf{15.225 \text{ kcal}}$

3	B) $P = \frac{E}{t}$ $360 = \frac{E}{18.000}$ $E = 6,48 \times 10^6 \text{ cal}$
	$E = 6,48 \times 10^6 \times 4$ $E = 2,592 \times 10^7 \cong \mathbf{2,6 \times 10^7 \text{ J}}$
4	$C = C_1 + C_2 = 1.400 + 1.400 = 2.800 \mu\text{F}$ $C = \frac{Q}{U}$
	$Q = U \times C$ $Q = (1,7 \times 10^2) \times (2,8 \times 10^3) \times (10^{-6}) = 0,476 \text{ C} \cong \mathbf{0,48 \text{ C}}$
	$E_p = \frac{CU^2}{2}$
	$E_p = \frac{(2,8 \times 10^3) \times (10^{-6}) \times (1,7 \times 10^2)^2}{2} = 40,46 \text{ J} \cong \mathbf{40,5 \text{ J}}$

5	A) $F_R = E - P - 3 \times T \times \text{sen } \theta = 0$ em repouso
	$\mu_{\text{ar}} \times g \times V - (M_B + M_{\text{He}}) \times g - 3 \times T \times \text{sen } \theta = 0$ $375 - 180 - 3 \times T \times 0,87 = 0$ $T = 74,71 \text{ N} \approx \mathbf{74,7 \text{ N}}$
	B) $\frac{P_0 V_0}{T_0} = \frac{P_1 V_1}{T_1}$ $P_0 V_0 = P_1 V_1$ $P_1 = \frac{P_0 V_0}{V_1}$ $P_1 = \frac{1 \times 30}{37,5}$ $P_1 = \mathbf{0,8 \text{ atm}}$
6	A) $\frac{V_P}{V_{S_2}} = \frac{N_P}{N_{S_2}}$
	$\frac{8.800}{220} = \frac{N_P}{N_{S_2}}$ $\frac{N_P}{N_{S_2}} = \mathbf{40}$
	B) $P = V_{S_1} \times i_{S_1} + V_{S_2} \times i_{S_2}$ $81.000 = 120 \times i_{S_1} + 220 \times 150$ $i_{S_1} = \mathbf{400 \text{ A}}$
7	A) espelho convexo
	imagem virtual
	B) $\frac{1}{f} = \frac{1}{p} + \frac{1}{p'}$ $-\frac{1}{25} = \frac{1}{225} + \frac{1}{p'}$ $p' = \mathbf{-22,5 \text{ cm}}$
	$\frac{i}{o} = -\frac{p'}{p}$ $\frac{i}{160} = -\frac{-22,5}{225}$ $i = \mathbf{16 \text{ cm}}$

8	$F_R = 0$ $R_1 + R_2 - 3P = 0$ $R_1 + R_2 = 3P$ $R_1 + R_2 = 600 \text{ N}$
	$M_R = 0$ $3,5 R_2 = 200 \times 0,5 + 200 \times 1,5 + 200 \times 2,5$ $3,5 R_2 = 900$ $R_2 = 257,14 \text{ N} \cong \mathbf{257,1 \text{ N}}$ $R_1 = 600 - 257,1 = 342,86 \text{ N} \cong \mathbf{342,9 \text{ N}}$
	B) $P = \frac{F}{A}$
	$P_1 = \frac{(70 + 20) \times 10}{600} = \mathbf{1,5 \text{ N/cm}^2}$
9	A) $S = S_0 + V_0 \times t + \frac{1}{2} \times a \times t^2$ $0,5 = 0 + 0 + \frac{1}{2} \times a \times (1)^2$ $a = 1 \text{ m/s}^2$ $V = V_0 + a \times t$ $V = 0 + 1 \times 3$ $V = 3 \text{ m/s}$
	$Q = m \times V$ $Q = 5 \times 3 = \mathbf{15 \text{ kgm/s}}$
	B) $S = S_0 + V_0 \times t + \frac{1}{2} \times a \times t^2$ $S = 0 + 0 + \frac{1}{2} \times 1 \times 3^2$ $S = 4,5 \text{ m}$
	$d = 4,5 - 2,0 = \mathbf{2,5 \text{ m}}$

10	<p>A) <math>U = E \times d</math>  <math>U = 2,4 \times 10^4 \times 10^{-1}</math></p>
	<p><math>U = 2,4 \times 10^3 \text{ V}</math></p>
	<p>B) <math>t = \frac{\Delta S}{V} = \frac{3,5}{0,7} = 5,0 \text{ s}</math>  <math>S = \frac{1}{2} \times a \times t^2</math>  <math>1 \times 10^{-1} = \frac{1}{2} \times a \times (5)^2</math>  <math>a = \frac{(0,2)}{25}</math>  <math>a = 8,0 \times 10^{-3} \text{ m/s}^2</math></p>
	<p><math>E = \frac{F_e}{q}</math>  <math>F_e = E \times q</math>  <math>F_e = (2,4 \times 10^4) \times (1,6 \times 10^{-18}) = 3,84 \times 10^{-14} \text{ N}</math>  <math>F_e = m \times a</math>  <math>m = \frac{F_e}{a} = \frac{3,84 \times 10^{-14}}{8 \times 10^{-3}} = 4,8 \times 10^{-12} \text{ kg}</math></p>