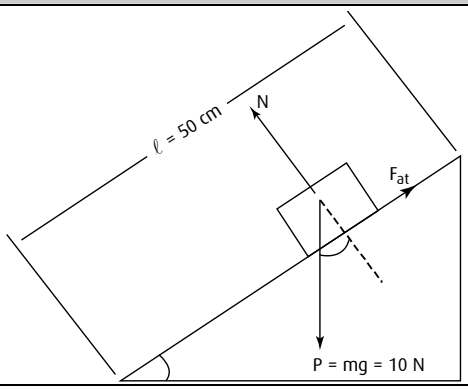
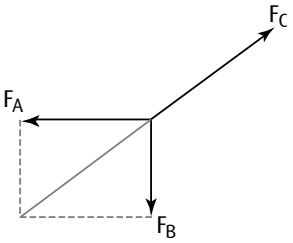
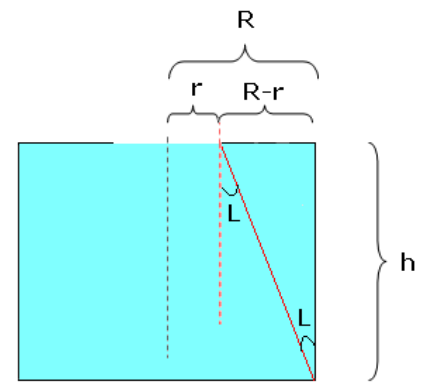
PADRÃO DE RESPOSTAS

(VALOR DE CADA QUESTÃO = 2 PONTOS)

Questão	Resposta
1	 $\text{sen}\theta = \frac{30}{50} = 0{,}6 \quad \rightarrow \cos\theta = \frac{40}{50} = 0{,}8$ $P\text{sen}\theta = F_{at} \rightarrow F_{at} = 10 \times 0{,}6 = 6\text{N}$ $P\cos\theta = N \rightarrow N = 10 \times 0{,}8 = 8\text{N}$ $F_{at} = \mu N \rightarrow \mu = \frac{F_{at}}{N} = \frac{6}{8} = 0{,}75$
2	 $F_C^2 = F_A^2 + F_B^2$ $\left(\frac{Gm_C m_X}{d_C^2}\right)^2 = \left(\frac{Gm_A m_X}{d_A^2}\right)^2 + \left(\frac{Gm_B m_X}{d_B^2}\right)^2$ $\left(\frac{m_C}{m_B}\right)^2 = \left(\frac{m_A}{m_B}\right)^2 \times \left(\frac{d_C}{d_A}\right)^4 + \left(\frac{d_C}{d_B}\right)^4 = (9 \times 16) + 81 = 225$ $\frac{m_C}{m_B} = 15$
3	$i = \frac{E}{R + r} \rightarrow i = \frac{100}{18 + 2} = 5\text{A}$ $Q_1 = L \times m \rightarrow Q_1 = 80 \times 200 = 16000 \text{ cal}$ $Q_2 = m \times c \times \Delta\theta \rightarrow Q_2 = 200 \times 1 \times 20 = 4000 \text{ cal}$ $Q = Q_1 + Q_2 \rightarrow Q = 16000 + 4000 = 20000 \text{ cal} = 84000 \text{ J}$ $p \times t = Q \rightarrow R_3 \times i^2 \times t = Q \rightarrow t = \frac{Q}{R_3 \times i^2} = \frac{84000}{200} = 420 \text{ s} = 7 \text{ minutos}$
4	 $tgL = \frac{R - r}{h} \rightarrow \quad r = R - tgL$ $\text{sen}L = \frac{1}{n_a} \rightarrow tgL = \frac{\text{sen}L}{\cos L} = \frac{\text{sen}L}{\sqrt{1 - \text{sen}^2 L}}$ $tgL = \frac{1}{n_a\sqrt{1 - \left(\frac{1}{n_a}\right)^2}} = \frac{1}{\sqrt{n_a^2 - 1}}$ $r = R - \frac{1}{\sqrt{n_a^2 - 1}} = 43 - \frac{36}{\sqrt{(1{,}345)^2 - 1}} = 3$ $d = 2r \Rightarrow d = 6 \text{ cm}$

5

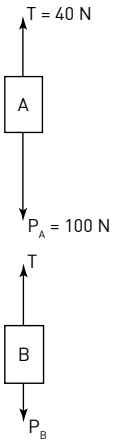
$$\Delta V_R = \Delta V_C + \Delta V_L$$

$$V_R\gamma_R\Delta\theta = V_C\gamma_C\Delta\theta + V_L\gamma_L\Delta\theta \Rightarrow (V_C + V_L)\gamma_R = V_C\gamma_C + V_L\gamma_L$$

$$\frac{V_C}{V_L} = \frac{\gamma_L - \gamma_R}{\gamma_R - \gamma_C} \rightarrow \frac{\frac{M_C}{\mu_C}}{\frac{M_L}{\mu_L}} = \frac{\gamma_L - \gamma_R}{\gamma_R - \gamma_C} \rightarrow \frac{M_C}{M_L} = \frac{\gamma_L - \gamma_R}{\gamma_R - \gamma_C} \times \frac{\mu_C}{\mu_L}$$

$$\frac{M_C}{M_L} = \frac{(20-8)\times 10^{-5}}{(8-4)\times 10^{-5}} \times \frac{6\times 10^3}{2\times 10^3} = 9$$

6



$$P_A - T = m_A a \Rightarrow a = \frac{60}{10} = 6 m/s^2$$

$$T - P_B = m_B a \Rightarrow m_B(a+g) = T$$

$$m_B = \frac{40}{16} = 2,5\,kg$$

7

$$\frac{U_p}{N_p} = \frac{U_s}{N_s} \Rightarrow \frac{100}{300} = \frac{U_s}{750} \Rightarrow U_s = 250\,V$$

$$C_{eq} = \frac{C}{2} + \frac{C}{2} \Rightarrow C_{eq} = C = 8\mu F$$

$$E_T = \frac{CU^2}{2} = \frac{8\times 10^{-6}\times (2,5)^2\times 10^4}{2} = 25\times 10^{-2}\,J$$

$$E_C = \frac{E_T}{4} = 6,25\times 10^{-2}\,J$$

8

$$\lambda = 0,5m$$

$$v = \lambda f$$

$$f = \frac{v}{\lambda} = \frac{400}{0,5} = 800\ Hz$$

9

$$PV = nRT \rightarrow$$

$$T = \frac{PV}{nR} \rightarrow T = \frac{1,23\times 30}{1\times 0,082} \rightarrow T = 4,5\times 10^2 K$$

$$Q = mc\Delta T$$

$$Q = 4\times 2,42\times 900 = 8,7\times 10^3 cal$$

10	$t = 8s \Rightarrow a_1 = \frac{T - P}{m} = \frac{16250 - 13000}{1300} = \frac{3250}{1300} = 2{,}5\,m/s^2$ $v_1 = a_1 t_1 = 2{,}5 \times 8 = 20 m/s$ $S_1 = \frac{1}{2} a_1 t_1^2 = \frac{1}{2} \times 2{,}5 \times 8^2 = 80\,m$ $a_2 = 5 m/s^2 \Rightarrow t_2 = \frac{v_1}{a_2} = \frac{20}{5} = 4\,s$ $S_2 = v_1 t_2 - \frac{1}{2} a_2 t_2^2 = 20 \times 4 - \frac{1}{2} \times 5 \times 16 = 40\,m$ $\Delta S = S_1 + S_2 = 80 + 40 = 120\,m$