Vestibular 2006 estadual

Padrão de Respostas

11/12/2005

(valor de cada questão = 2 pontos) **Física**

Questão		Resposta
1	A)	$g_T = G\frac{M_T}{R_T^2}$ $g_h = G\frac{M_T}{(R_T + h)^2}$
		$g_T \times R_T^2 = g_h \times (R_T + h)^2$ $10 \times (6,4 \times 10^6)^2 = g_h \times (6,4 \times 10^6 + 29,6 \times 10^6)^2$ $g_h = \frac{40,96 \times 10^{13}}{12,96 \times 10^{14}} = \mathbf{0,3 m/s^2}$
	B)	$v = \omega \times R$ $v = \frac{2\pi}{T} R$ $T = 1\,\text{dia} = 24\,\text{horas} = 86.400\,\text{segundo}$
		$v = \frac{2 \times 3 \times (29.600.000 + 6.400.000)}{86.400} = \mathbf{2.500 m/s}$
2	A)	$P = E$
		$m \times g = \mu \times V_{desl.} \times g$ $1,5 \times 10^8 = 1,025 \times 10^3 \times V_{desl.}$ $V_{desl.} = \frac{1,5 \times 10^8}{1,025 \times 10^3} = \mathbf{1,46 \times 10^5 m^3}$
	B)	$v = v_0 + a \times t$
		$v_0 = 30 \times 0,5 = 15 m/s \Rightarrow 0 = 15 + a \times 300$ $\lvert a \rvert = 5 \times 10^{-2} m/s^2$ $F_R = 1,5 \times 10^8 \times 5 \times 10^{-2} = \mathbf{7,5 \times 10^6 N}$
3	A)	$\alpha = \frac{\Delta L}{L_0 \Delta\theta} = \frac{12 \times 10^{-4}}{10^2} = 12 \times 10^{-6}\ °C^{-1} \Rightarrow \gamma = 3\alpha = 36 \times 10^{-6}\ °C^{-1}$
		$\Delta V = V_0 \gamma \Delta\theta = 1,4 \times 10^5 \times 3,6 \times 10^{-5} \times 5 = \mathbf{25,2 m^3}$
	B)	Mar Vermelho. A maior salinidade desse mar implica uma maior densidade da água, o que acarreta um maior empuxo E. Dessa forma, o volume submerso será menor.

4	A)	$P = \frac{F}{A}$ $F = m \times g = 2{,}16 \times 10^5 \times 10 = 2{,}16 \times 10^6 N$ $A = 12\,x\,(0{,}5)^2 = 12\,x\,0{,}25 = 3m^2$
		$P = \frac{2{,}16 \times 10^6}{3} = \mathbf{7{,}2 \times 10^5\ N/m^2}$
	B)	$\varphi_{umaespira} = BA = 1{,}5 \times 10^{-2} \times \pi \times 2^2 = 0{,}18Wb$ $\varphi_{total} = 10^4 \times 0{,}18 = 1{,}8 \times 10^3 Wb$ $\Delta\varphi = 0 - \varphi_{total} = -\varphi_{total}$
		$\varepsilon_m = -\frac{\Delta\varphi}{\Delta t} = -\frac{-1{,}8 \times 10^3}{5{,}0 \times 10^{-2}} = \mathbf{3{,}6 \times 10^4 V}$
5	A)	$Q_1 = m \times c \times \Delta\theta = 1{,}0 \times 10^5 \times 1{,}0 \times (100 - 25) = 75 \times 10^5 = 7{,}5 \times 10^6 cal$
		$Q_2 = L \times m = 540 \times 1{,}0 \times 10^5 = 5{,}4 \times 10^7\ cal$
		$Q_3 = m \times A$ $A = \frac{B + b}{2} \times h = \frac{0{,}75 + 0{,}45}{2} \times 200 = 120\,cal/g$ $Q_3 = 10^5 \times 1{,}2 \times 10^2 = 1{,}2 \times 10^7 cal$ $Q_T = Q_1 + Q_2 + Q_3 = 7{,}5 \times 10^6 + 5{,}4 \times 10^7\ cal + 1{,}2 \times 10^7 = \mathbf{7{,}4 \times 10^7\ cal}$
	B)	$\begin{cases} 1\,g \_\_\_\_\_ 10.000 cal \\ 4.320\,g \_\_\_\_\_ x\ cal \end{cases}$ $x = 4{,}32 \times 10^7\ cal$
		$P_T = \frac{Q}{t} = \frac{4{,}32 \times 10^7}{3600} = 1{,}2 \times 10^4\ cal/s$
		$\eta = \frac{P_U}{P_T}$ $0{,}7 = \frac{P_U}{1{,}2 \times 10^4} = \mathbf{8{,}4 \times 10^3\ cal/s}$
6	A)	$f_n = \frac{n \times v}{2 \times L} = \frac{2 \times 340}{2 \times 7} = \mathbf{48{,}6\ Hz}$
	B)	$V_{rel} = V_{som} - V_{trans.} = 340 - 5 = 335 m/s$ $V_{med.} = \frac{\Delta S}{\Delta t} \Rightarrow \Delta t = \frac{9.045}{335} = \mathbf{27\ s}$

7	A)	$P_T = U \times i$
		$i = \frac{P_T}{U} = \frac{4.000 \times 60 + 600 \times 200}{120} = \frac{360.000}{120} = \mathbf{3.000A}$
	B)	$E = P \times t = 360 \times 12 \times 10 = 43.200\,kWh$
		$\begin{cases} 1\,kWh \_\_\_\_\_ R\$0,40 \\ 43.200\,kWh \_\_\_\_\_ x \end{cases}$ $x = \mathbf{R\$17.280,00}$
8	A)	$\Delta U = 0\,(ciclo)$
	B)	$V_{amb} = 20 \times 50 \times 5 = 5.000\,m^3$
		$d_{ar} = \frac{m_{ar}}{V_{amb}} \Rightarrow m_{ar} = 5.000 \times 1,25 = 6.250\,kg$
		$\begin{cases} 18\ segundos \_\_\_\_\_ 25kg \\ t \_\_\_\_\_ 6.250kg \end{cases}$
		$t = \frac{18 \times 6.250}{25} = \mathbf{4.500s}$
9	A)	$G = \frac{f_{ob}}{f_{oc}} \Rightarrow 10 = \frac{40}{f_{oc}} \Rightarrow f_{oc} = 4cm$ $V_{ob} = \frac{1}{f_{ob}} = \frac{1}{0,4} \Rightarrow V = \mathbf{2,5di}$
		$V_{oc} = \frac{1}{f_{oc}} = \frac{1}{0,04} \Rightarrow V = \mathbf{25di}$
	B)	objetiva: imagem real; ocular: imagem virtual
10	A)	$M_1 = F_1 \times 100 = -100 \times 10^4 N.m$
		$M_2 = F_2 \times 80 = 160 \times 10^4 N.m$
		$M_{total} = M_1 + M_2 = \mathbf{6,0 \times 10^5 N.m}$
	B)	$F_R = F_1 + F_2 = 3,0 \times 10^4 N$
		$I = F_R \times \Delta t = 3,0 \times 10^4 \times 60 = \mathbf{1,8 \times 10^6 N.s}$