

PAUTES DE CORRECCIÓ
SÈRIE 4FÍSICA
CURS 2005-06

P1. a) $W = M g (H - h)$ [0,7] $\rightarrow W = 300 \cdot 10 \cdot (15 - 5) = 3 \cdot 10^4 \text{ J}$ [0,3]

b) $W_{nc} = \Delta E = \Delta(u + E_c)$ [0,7]

$$W_{nc} = -30.000 + \frac{1}{2} 300 (10^2 - 0^2) = -15.000 \text{ J}$$

$$Q = -1,5 \cdot 10^4 \text{ J}$$
 [0,3]

c) $N - M g = M \frac{v^2}{R}$ [0,7]

$$N = M \left(g + \frac{v^2}{R} \right) \rightarrow N = 8 \cdot 10^3 \text{ N}$$
 [0,3]



Q1. a) $\theta = \theta_0 + \omega_0 t + \frac{1}{2} \alpha t^2$ [0,2] $\rightarrow \alpha = \frac{2\theta}{t^2} = \frac{\pi}{40} \text{ rad/s}^2$ [0,1]

$$\omega = \omega_0 + \alpha t$$
 [0,1] $\rightarrow \omega = \frac{\pi}{40} \cdot 15 \text{ rad/s}$

$$a_n = \omega^2 r$$
 [0,1] $\rightarrow a_n = \left(\frac{\pi}{40} \cdot 15 \right)^2 \cdot 0,15 = 0,21 \text{ m/s}^2$ [0,1]

b) $a_t = \alpha \cdot r$ [0,3] $\rightarrow a_t = \frac{\pi}{40} \cdot 0,15 = 1,2 \cdot 10^{-2} \text{ m/s}^2$ [0,1]

Q2.
$$\left. \begin{aligned} g_L/5 &= G \frac{M_L}{(R_L + h)^2} \\ g_L &= G \frac{M_L}{R_L^2} \end{aligned} \right\} \begin{aligned} 5 &= \left(\frac{R_L + h}{R_L} \right)^2 \rightarrow h = R_L (\sqrt{5} - 1) \\ h &= 2,15 \cdot 10^6 \text{ m} \end{aligned}$$
 [0,2] [0,2] [0,4] [0,2]

OPció A

P2. a) $A = 0,01 \text{ m}$ [0,2]

$$k = 2\pi/\lambda = 2\pi\nu/v \rightarrow k = 2\pi \cdot \frac{4}{3} \text{ rad/m}$$
 [0,2]

$$\omega = 2\pi\nu \rightarrow \omega = 2\pi \cdot 440 \text{ rad/s}$$
 [0,2]

$$\rightarrow \psi = 0,01 \cdot \cos 2\pi \left(\frac{4}{3} x - 440 t \right)$$
 [0,4]

la solució en sin també és vàlida

b) $\phi = k \cdot \Delta x$ [0,6] $\rightarrow \phi = 5\pi \text{ rad}$ [0,2]

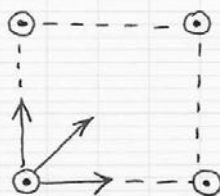
Defasatge real: $\pi \text{ rad}$. [0,2]

SÈRIE 4 (CONT.)

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c) $v_{\max} = +A\omega$ [0,6] $\rightarrow v_{\max} = 27,65 \text{ m/s}$ [0,4]

Q3.



Totes les forces són d'atracció! [0,4]

La resultant té la direcció de la diagonal del quadrat i sentit cap al centre. [0,6]

Q4.

$$E = h\nu$$
 [0,2]

$$\lambda = c/\nu$$
 [0,2]

$$\left. \begin{array}{l} E = h\nu \\ \lambda = c/\nu \end{array} \right\} E = \frac{hc}{\lambda}$$
 [0,1] $\rightarrow E = 3,3 \cdot 10^{-19} \text{ J}$ [0,1]

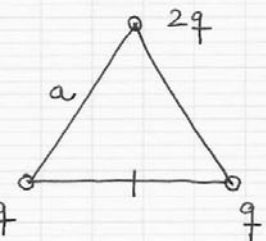
$$p = \frac{h}{\lambda}$$
 [0,3]

$$\rightarrow p = 1,1 \cdot 10^{-27} \frac{\text{kg} \cdot \text{m}}{\text{s}}$$
 [0,2]

Opció B

P2. a) $V = k \left(\frac{q}{a/2} + \frac{q}{a/2} + \frac{2q}{\sqrt{a^2 - \frac{a^2}{4}}} \right)$ [0,7]

$$V = k \frac{q}{a} \left(2 + 2 + \frac{4}{\sqrt{3}} \right) = 3,28 \cdot 10^6 \text{ V}$$
 [0,3]



b) $\vec{E} = k \frac{q}{\left(\frac{a}{2}\right)^2} (1,0) + k \frac{q}{\left(\frac{a}{2}\right)^2} (-1,0) + k \frac{2q}{a^2 - \frac{a^2}{4}} (0,-1)$ [0,3]

$$\rightarrow \vec{E} = 8 \cdot 10^5 (0,-1) \text{ N/C}$$
 [0,4]

c) $W = 2q \cdot (V_f - V_i)$ [0,3]

$$V_i = k \left(\frac{q}{a} + \frac{q}{a} \right)$$
 [0,2]

$$V_f = k \left(\frac{q}{a/2} + \frac{q}{a/2} \right)$$
 [0,2]

$$W = 2q \cdot k \frac{2q}{a} = 2,1 \text{ J}$$
 [0,3]

Q3. 1.a, 2.b

Q4. 1.c, 2.a

Correcta: [0,5]

En blanc: [0]

Incorrecta: [-0,25]

El total de Q3+Q4
entre 0 i 2 punts
(no puntuacions
negatives)