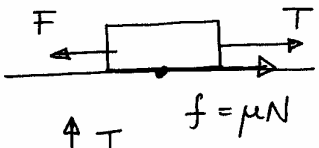
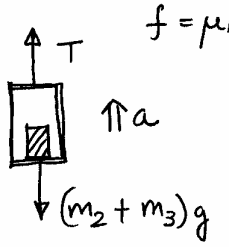
SÈRIE 3. PAU. LOGSE. CURS 2002-2003 FÍSICA

PAUTES DE CORRECCIÓ

P1. (a) 

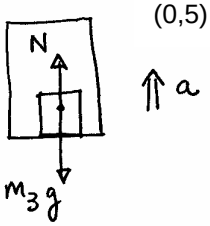
$F - T - \mu m_1 g = m_1 a$ (0,5)



$T - (m_2+m_3) g = (m_2+m_3) a$ (0,5)

$\Rightarrow$ $a = \boxed{1{,}5\ m/s^2}$ (0,5)

$T = \boxed{1.265\ N}$ (0,5)

(b) 

(0,5)

$N - m_3 g = m_3 a \longrightarrow N = \boxed{115\ N}$ (0,5)

Q1. $v = 2\pi \cos(10\pi t)$, $a = -20\pi^2 \sin(10\pi t)$

- $E_{c\,max} = \frac{1}{2} m v_{max}^2 = \boxed{9{,}87\ J}$ (0,25) $\longrightarrow$ En el punt mig de l'oscil·lació. (0,25)
- $F_{max} = m \cdot a_{max} = \boxed{98{,}7\ N}$ (0,25) $\longrightarrow$ En els extrems de l'oscil·lació. (0,25)

Q2. $E = k|q|/r^2$, $V = kq/r$ (0,5) $\longrightarrow |q| = \frac{1}{k}\frac{V^2}{E} = \boxed{1 \times 10^{-10}\ C}$ (0,25)

$\longrightarrow$ q negativa (com V) (0,25)

OPCIÓ A / SÈRIE 3

P2. (a) $T = 1$ dia $= 86.400$ s (0,25)

$G M_T m / r^2 = m \omega^2 r \longrightarrow r^3 = G M_T (T/2\pi)^2$ (0,5)

$\longrightarrow r = 4{,}23 \times 10^7\ m \longrightarrow h = r - R_T = \boxed{3{,}59 \times 10^7\ m}$ (0,25)

(b) $\mathcal{U} = -G\frac{M_T m}{r} = \boxed{-2{,}84 \times 10^9\ J}$ (0,5)

$E = \mathcal{U} + E_c = -\frac{1}{2} G \frac{M_T m}{r} = \frac{1}{2}\mathcal{U} \longrightarrow E = \boxed{-1{,}42 \times 10^9\ \text{J}}$ (0,5)

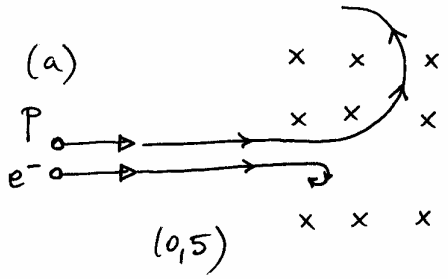
(c) $E = E_c^* + \mathcal{U}(R_T) \longrightarrow E_c^* = E + G\frac{M_T m}{R_T} = \boxed{1{,}74 \times 10^{10}\ \text{J}}$ (0,5)
(0,5)

Q3. $\vec{T} \perp d\vec{r} \Rightarrow W_T = 0$ (0,5); $W_{mg} = -\Delta\mathcal{U} = \boxed{mg \cdot 2L}$ (0,5)

Q4. ν no canvia (0,25) $\longrightarrow$ $E = h\nu$ no canvia (0,25)
v es modifica (0,25) $\longrightarrow$ $\lambda = v/\nu$ també es modifica (0,25).

OPCIÓ B / SÈRIE 3

P2.



(0,5)

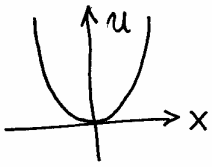
$qvB = m v^2/r \longrightarrow \boxed{m/r = \frac{qB}{v}}$ (0,25)

$m_p \gg m_e \longrightarrow r_p \gg r_e$ (0,25)

(b) $|q_p| = |q_e| \longrightarrow r_p/r_e = m_p/m_e = \boxed{1758}$ (1,0)

(c) $\frac{m}{r} = \frac{qB}{v}$ amb $v = \omega r = \left(\frac{2\pi}{T}\right) r$ $\longrightarrow$ $\frac{T_p}{T_e} = \frac{m_p}{m_e} = \boxed{1758}$ (0,5)
(0,5)

Q3. $\mathcal{U} = \frac{1}{2}kx^2$ (0,5) $\longrightarrow$ paràbola amb les branques cap amunt $\longrightarrow$



(0,5)

Q4. Circuit complet: $6 = iR + \frac{i}{2}\cdot 20$ (0,25)
Branca 1 bombeta: $3 = \frac{i}{2}\cdot 20$ (0,25)
$\Big\}$ $i = 0{,}3\,\text{A}$
$\boxed{R = 10\,\Omega}$ (0,5)
