J

$$E = \frac{-K^2 Z^2 m_e e^4}{2 n^2 \hbar^2} =$$

$E =$ _

① $\frac{1}{\lambda} = R\left(\frac{1}{n_f^2} - \frac{1}{n_i^2}\right) =$

$R' = (R Z^2) =$

$\frac{1}{\lambda} = R'\left(\frac{1}{n_f^2} - \frac{1}{n_i^2}\right)$

$\frac{1}{\lambda} = R(2)\left(\frac{1}{n_f^2} - \frac{1}{n_i^2}\right)$

$\frac{1}{\lambda} = 2R\left(\frac{1}{2^2} - \frac{1}{3^2}\right) = 2R\left(\frac{9-4}{36}\right) = 2R\left(\frac{5}{36}\right) = \frac{5R}{18}$

$\lambda = \frac{18}{5R} = \frac{18}{5(1.096 \times 10^{-7})} = 328.4$

$$E_1 = \frac{-13,6\, Z^2}{n^2} = \frac{-13.6(2)^2}{1} = -13.6 \times 4 = -54.4$$

$$E_2 = \frac{-13,6\, Z^2}{n_2^2} = \frac{-13,6(2)^2}{4} = -13.6$$

$$E_f = -13.6 + 54.4 = 40.8$$

$$\frac{1}{\lambda} = R_Z^2 \left| \frac{1}{4} - 1 \right| = R^2 R \left(\frac{3}{4}\right) = 3R$$

$$\lambda = \frac{1}{3R} = 30.4\ nm$$

c) No esta dada q.e en $< a\ 400$

4) $\frac{mv^2}{r} = \frac{zke^2}{r^2}$ a_0 - Radio de borg

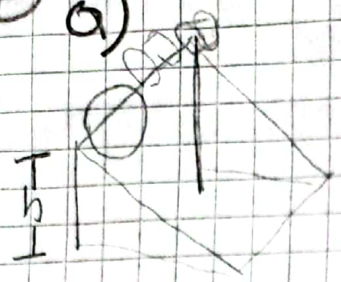
$L = nh = mvr$

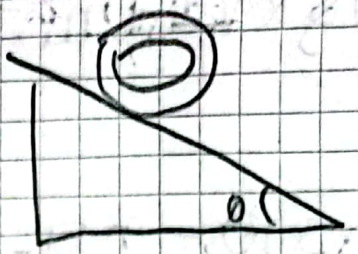
$$r = a_0 \frac{n^2}{Z} = 5.29167 \times 10^{-11} \left(\frac{1}{2}\right) = 2.64$$

$$r_2 = a_0 \left(\frac{4}{2}\right) = 2a_0 = 1.05$$

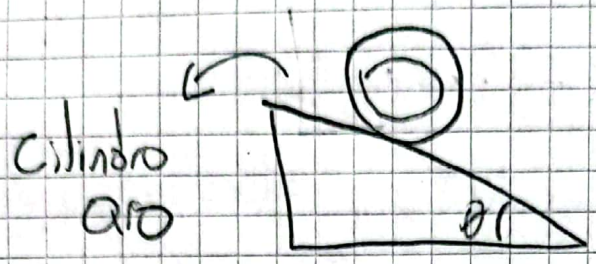
$$r_3 = a_0 \left(\frac{9}{2}\right) = 4.5 a_0 = 2.38$$

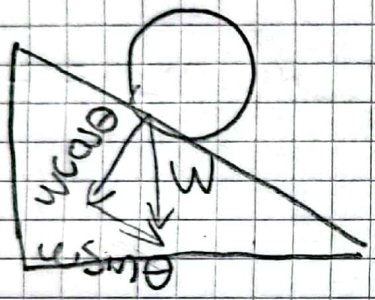
① a)





b)





$W\sin\theta - f_r = ma \Rightarrow W\sin\theta - I\frac{\alpha}{r} = ma$

$N - mg\cos\theta = 0$

$mg\sin\theta - \frac{2}{3}Ma = ma$

$f_r = I_0\alpha$

$g\sin\theta = a + \frac{2}{3}ar$

$a = r\alpha$

$g\sin\theta = \frac{5}{3}a$

$a = \frac{3}{5}g\sin\theta$

$$mg\,sen\theta - mr^2\frac{\alpha}{r} = ma$$

$$mg\,sen\theta - ma = ma$$

$$g\,sen\theta = 2a$$

$$a = \frac{g\,sen\theta}{2}$$

* cilindro hueco

$$mg\,sen\theta - I_0\alpha = ma$$

$$mg\,sen\theta - \frac{1}{2}mr^2\frac{a}{r} = ma$$

$$g\,sen\theta - \frac{1}{2}ra = a$$

$$g\,sen\theta = a + \frac{1}{2}ra$$

$$g\,sen\theta = a\left(1 + \frac{r}{2}\right)$$

$$a = \frac{g\,sen\theta}{\left(1 + \frac{r}{2}\right)}$$

b)

$$mgh + \frac{mv_i^2}{2} = \frac{mv_F^2}{2} + \frac{I\omega^2}{2}$$

$$mgh = \frac{mv_F^2}{2} =$$

$$\frac{1}{2} I_0 \omega^2 = E$$

$$mgh = \frac{1}{2} I \omega^2$$

$$mgh = \frac{m\omega^2 R^2}{2} + \frac{I\omega^2}{2} = \frac{m\omega^2 r^2}{2} + \frac{Am r^2 \omega^2}{2}$$

$$gh = \frac{5}{6} \omega^2 r^2$$

$$\omega^2 = \frac{6}{5} \frac{gh}{r^2} \Rightarrow \omega r = \sqrt{\frac{6}{5} gh} = V_F$$

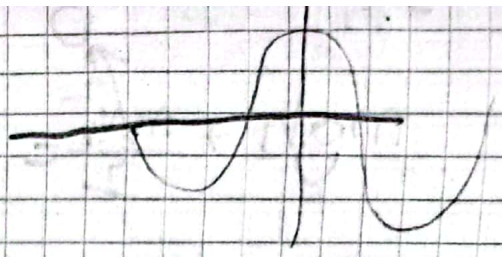
$$\frac{A+1}{2}$$

$$gh = \frac{\omega^2 r^2}{2} + \frac{A \omega^2 r^2}{2}$$

$$gh = \omega^2 r^2 \left(\frac{1}{2} + \frac{A}{2}\right)$$

$$\sqrt{\frac{gh}{\left(\frac{1}{2} + \frac{A}{2}\right)}} = \omega^2 r^2 = V_f^2$$

② a) $\omega_0 = \sqrt{\frac{500}{4}} = 11.18$

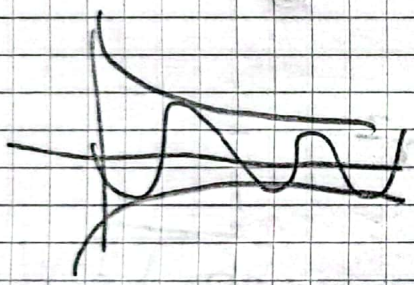


b) $x = A \cdot \text{Sen}(11.18t)$

$v = -A\cos(11.18t)(11.18)$

$= -A(11.18)\cos(11.18t)$

$T = \frac{2\pi}{11.18} =$



(3)

$$\frac{1}{2}MR^2\left(2\frac{rad}{s}\right) = \left(\frac{1}{2}MR^2 + MR^2\right)\omega_F$$

$$\frac{1}{2}(100)(2m)^2(2) = \left(\frac{1}{2}(100) + 60\right)(2m)^2\omega_F$$

$$400 = (110)4\,\omega_F$$

$$400 = 440\,\omega_F$$

$$\frac{400}{440} = \omega_F$$

$$\omega_F = \frac{10}{11}$$