Definicións *(unidades, SI)* | Constantes | Leis, Relacións | Consecuencias

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L (*m*), $L^2 = S$ *(m^2)*, $L^3 = V$ *(m^3)*

$\pi = 3'14$

Esfera: $S = 4\pi r^2$ $V = (4/3)\,\pi r^3$
Cilindro: $S = 2\cdot \pi r^2 + 2\pi r h$ $V = \pi r^2 h$

M.R.: $\mathbf{e}/t = \mathbf{v}$ *(m/s)*, $\mathbf{v}/t = \mathbf{a}$ *(m/s^2)*
M.C.: $e/r = \varphi$ *(rad)*, $v/r = \omega$ *(rad/s)*

π *rad* = 180º

MRU: $e = e_0 + vt$ | MUA: $v = v_0 + at$
MCU: $\varphi = \varphi_0 + \omega t$ | $e = e_0 + v_0 t + at^2/2$
$a_N = v^2 / r = \omega^2 r$ | $v^2 = v_0^2 + 2ae$

F *(N)*, $\mathbf{F}\cdot\mathbf{e} = W = \Delta E$ *($J = N\cdot m$)*
$\mathbf{F}_g / m = \mathbf{g}$ *($N/kg = m/s^2$)*
$Ep_g / m = V_g$ *(J/kg)*
$\mathbf{F}_e / q = \mathbf{E}$ *(N/C)*
$Ep_e / q = V_e$ *($J/C = V$)*

$G = 6'7 \cdot 10^{-11}$ *$m^3 \cdot s^{-2} \cdot kg^{-1}$*

$\mathbf{Fg} = GMm/r^2\,(-\mathbf{u}_r)$
$Ep_g = -GMm/r$
$\mathbf{Fe} = Kq_1q_2/r^2\,(\mathbf{u}_r)$
$Ep_e = K q_1 q_2 / r$

Velocidade de escape: $v^2 = 2GM/R$
Orbitas Kepler: $\omega^2 \cdot r^3 = GM = cte$

Fluxo: $\mathbf{E}\cdot\mathbf{S} = \Phi$ *($N m^2/C$)*
$q/S = \sigma$ *(C/m^2)*, $q/L = \lambda$ *(C/m)*

$K = 9\cdot 10^9$ *$N m^2 C^{-2}$*
$\varepsilon_0 = 1/4\pi K$

Gauss: $\Phi_T = Q/\varepsilon_0$

Liña de carga: $\mathbf{E} = 2K\lambda / r$
Plano infinito: $\mathbf{E} = \sigma / 2\varepsilon_0$

Campo magnético: **B** *(T)*
Circulación: $\mathbf{B}\cdot\mathbf{L} = C_B$ *($T\cdot m$)*
Fluxo: $\mathbf{B}\cdot\mathbf{S} = \Phi_m$ *($W = T\cdot m^2$)*

$\mu_0 = 4\pi\cdot 10^{-7}$ *$Tm/A = N/A^2$*

$\mathbf{F}_m = q\mathbf{v}\times\mathbf{B}$
$C_B = \mu_0 I$
$V_{ind} = -\Delta\Phi_B / t$

Ciclotrón: $R = mv/qB$, $\omega = qB/m$
I lineal: $B = \mu_0 I / 2\pi r$ (toroide: $\cdot N$)
Fem. ind: vBL (despr.), NBSω (xiro)

Oscilacións: $y = A\,\mathrm{sen}(\omega t + \varphi_0)$
T *(s)*, $1/T = f$ *(Hz)*, $2\pi f = \omega$ *(rad/s)*

Elasticidade: $-F/y = k$ *(N/m)*
Newton: $F = ma$

$v_m = A\omega$, $a = -y/\omega^2$
$E_T = \tfrac{1}{2} m v_m^2 = \tfrac{1}{2} kA^2$

Resorte: $\omega^2 = k/m$
Péndulo: $\omega^2 = g/L$

Ondas: $y = A\,\mathrm{sen}(wt - kx)$
λ *(m)*, $1/\lambda = \nu$ *(m^{-1})*, $2\pi\nu = k$ *(rad/m)*

$v = \lambda/T = \omega/k$

Interferencia (franxan): $y_n = n\lambda L / d$

Ondas electromagn: $c = 1/(\varepsilon_0\mu_0)^{1/2}$

Optica: $1/F = P$ *($dioptr = m^{-1}$)*
Aumento lateral: $A = y_{im}/y_{ob}$
Refracción: $n = 1/v$, $n_{12} = v_1/v_2$

Espello esf: $F = r/2$

$d_{vis} = 25$ *cm*

$P_{im} + P_{ob} = P_{lte}$
$A = P_{ob}/P_{im} = d_{im}/d_{ob}$
$n_1 \cdot \mathrm{sen}\,\varphi_1 = n_2 \cdot \mathrm{sen}\,\varphi_2$ (Snell)

Lupa: $A = d_{vis}/f$
Telescopio: $A = f_{ob}/f_{oc}$
Microsc: $A = (L/f_{ob})\cdot A_{oc}$

Relatividade: $\beta = v/c$
$\gamma = 1/(1-\beta^2)^{1/2}$

$c = 3\cdot 10^8$ *m/s*
c : velocidade límite e invariante

Dilatación temporal: γ
Contracción espacial: $1/\gamma$

$E_0 = mc^2$
$Ec = m(\gamma - 1)$

Cuántica:
Ondas: $E = hf$, $P = h/\lambda$
Partículas: $\lambda = h/p$, $f = E/h$

$h = 6'6 \cdot 10^{-34}$ *$J\cdot s = kg\,m^2/s$*

Indeterminación:
$\Delta p \cdot \Delta x > h/4\pi$
$\Delta E \cdot \Delta t > h/4\pi$
(Heisenberg)

Efecto fotoeléctrico: $hf = W_0 + Ec_e$
Potencial retardador: $Vr = (h/q)\,f - (W_0/q)$

Física Nuclear:
Enerxía de enlace: $E = \Delta m \cdot c^2$
Radiactividade: $dN/dt = -\lambda N$
Cte. de desintegr.: λ *(s^{-1})*

Radiac. natural: α: He_2^4, β: e_{-1}^0, γ: f_0^0
Radiac. artific.: p_1^1, n_0^1

Desintegración: $N = N_0\, e^{-\gamma t}$

Tempo de vida media: $\tau = 1/\lambda$
Perido de semidesint.: $t_{1/2} = \ln 2/\lambda = 0'69\,\tau$

$Q_e = 1'6 \cdot 10^{-19}$ C $m_e = 9'1 \cdot 10^{-31}$ Kg $m_p = 1'7 \cdot 10^{-27}$ Kg