Formularium Vlaamse Fysica Olympiade

De formules zijn als geheugensteun bedoeld, er zijn geen vectoriële notaties gegeven.

$$\frac{n_b}{n_a} = \frac{\sin i_a}{\sin r_b} \qquad \frac{1}{v} + \frac{1}{b} = \frac{1}{f} \qquad G = -\frac{b}{v}$$

$$x = x_0 + v_x \cdot t \qquad v_x = v_{x,0} + a_x \cdot t \qquad x = x_0 + v_{x,0} \cdot t + \frac{a_x}{2} \cdot t^2$$

$$F_z = m \cdot g \qquad F_v = k \cdot \Delta l \qquad F_g = G\frac{m_1 \cdot m_2}{r^2}$$

$$F_w = \mu \cdot F_n \qquad F_{cp} = m \cdot v^2 / R$$

$$W = \vec{F}_x \cdot \Delta\vec{x} \qquad E_k = \frac{m \cdot v^2}{2} \qquad E_p = m \cdot g \cdot h \qquad E_p = k \cdot \frac{(\Delta \ell)^2}{2} \qquad E_p = -G\frac{m_1 \cdot m_2}{r}$$

$$p = \frac{F}{A} \qquad p_{hyd} = \rho \cdot g \cdot h \qquad F_A = \rho_{vl} \cdot g \cdot V \qquad p \cdot V = n \cdot R \cdot T$$

$$C = \frac{Q}{\Delta T} \qquad c = \frac{Q}{m \cdot \Delta T} \qquad l = \frac{Q}{m}$$

$$\Delta U = Q - W$$

$$C_p - C_V = R \qquad \gamma = \frac{C_p}{C_V} \qquad p_1 \cdot V_1^{\gamma} = p_2 \cdot V_2^{\gamma} \qquad \gamma(\text{1atomig}) = 5/3 \qquad \gamma(\text{2atomig}) = 7/5$$

$$C_V(\text{1 atomig gas}) = \frac{3}{2}R \qquad C_V(\text{2 atomig gas}) = \frac{5}{2}R$$

$$|F| = k\frac{|Q_1| \cdot |Q_2|}{r^2} \qquad E = \frac{F}{Q} \qquad |E| = k\frac{|Q|}{r^2} \qquad V = k\frac{Q}{r} \qquad E = \frac{U}{d}$$

$$U = R \cdot I \qquad R_s = R_1 + R_2 \qquad \frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2}$$

$$Q = R \cdot I^2 \cdot \Delta t \qquad P = U \cdot I$$

$$U_R = R \cdot I \qquad U_C = \frac{1}{C \cdot \omega} I \qquad U_L = L \cdot \omega \cdot I$$

$$\Delta\phi(U_C, I_C) = -\frac{\pi}{2} \qquad \Delta\phi(U_L, I_L) = +\frac{\pi}{2}$$

$$F = B \cdot I \cdot l \ (\alpha = 90°) \qquad F = B \cdot Q \cdot v \ (\alpha = 90°)$$

$$B = \mu_0 \cdot \frac{I}{2 \cdot \pi \cdot d} \qquad B = \mu_0 \cdot \frac{N \cdot I}{l}$$

$$\Phi = B \cdot A \cdot \cos\alpha \qquad U_i = -N \cdot \frac{\Delta\Phi}{\Delta t}$$

$$E = m \cdot c^2 \qquad E = h \cdot f \qquad A_{gemid} = -\frac{\Delta N}{\Delta t} \qquad A(t) = \lambda N(t)$$

$$N(t) = N_0 \cdot e^{-\lambda \cdot t} = N_0 \cdot 2^{-t/T_{1/2}} \qquad \lambda = \frac{0{,}693}{T_{1/2}} \qquad \omega = \frac{2\pi}{T} \qquad f = \frac{1}{T} \qquad V_{bol} = 4\,\pi\,.\,R^3/3$$

Numerieke gegevens Vlaamse Fysica Olympiade

$n_{glas} = 1,50$ $n_{plexi} = 1,49$ $n_{water} = 1,33$ $c = 299\,792\,458$ m . s^{-1}

$g = 9,81$ m s^{-2}

$\vartheta = -273$ °C $\Leftrightarrow$ $T = 0$ K

$R = 8,31$ J mol^{-1} K^{-1}

$k = 8,99 \cdot 10^{9}$ N m^2 C^{-2}

$G = 6,673 \cdot 10^{-11}$ N m^2 kg^{-2}

$\rho_{water} = 1,00 \cdot 10^{3}$ kg m^{-3} $\rho_{kwik} = 13,6 \cdot 10^{3}$ kg m^{-3} $\rho_{lucht} = 1,29$ kg m^{-3}

$p_0 = 1,01 \cdot 10^{5}$ Pa $= 1,01$ bar

$c_{water} = 4,19 \cdot 10^{3}$ J kg^{-1} K^{-1} $c_{ijs} = 2,09 \cdot 10^{3}$ J kg^{-1} K^{-1} $c_{stoom} = 2,01 \cdot 10^{3}$ J kg^{-1} K^{-1}

$l_{water\text{-}ijs} = 334 \cdot 10^{3}$ J kg^{-1} $l_{water\text{-}stoom} = 2260 \cdot 10^{3}$ J kg^{-1}

$\mu_0 = 4\,\pi \cdot 10^{-7}$ T m A^{-1}

$N_A = 6,02 \cdot 10^{23}$ mol^{-1}

$m_e = 9,11 \cdot 10^{-31}$ kg $m_p = 1,673 \cdot 10^{-27}$ kg $m_n = 1,675 \cdot 10^{-27}$ kg

1 u $= 1,66 \cdot 10^{-27}$ kg

1 eV $= 1,602 \cdot 10^{-19}$ J

$e = 1,60 \cdot 10^{-19}$ C $h = 6,626 \cdot 10^{-34}$ J . s

$Q_{elektron} = -e$ $Q_{positron} = -Q_{elektron}$ $Q_{muon} = Q_{elektron}$ $Q_{foton} = 0$