



Formularium Vlaamse Fysica Olympiade

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

$$\frac{n_b}{n_a} = \frac{\sin i_a}{\sin r_b}$$

$$\frac{1}{v} + \frac{1}{b} = \frac{1}{f}$$

$$G = -\frac{b}{v}$$

$$x = x_0 + v_x \cdot t$$

$$v_x = v_{x,0} + a_x \cdot t$$

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

$$F_z = m \cdot g$$

$$F_v = k \cdot \Delta l$$

$$F_g = G \frac{m_1 \cdot m_2}{r^2}$$

$$F_w = \mu \cdot F_n$$

$$F_{cp} = m \cdot v^2 / R$$

$$W = \vec{F}_x \cdot \Delta \vec{x}$$

$$E_k = \frac{m \cdot v^2}{2}$$

$$E_p = m \cdot g \cdot h$$

$$E_p = k \cdot \frac{(\Delta \ell)^2}{2}$$

$$E_p = -G \frac{m_1 \cdot m_2}{r}$$

$$p = \frac{F}{A}$$

$$p_{\text{hyd}} = \rho \cdot g \cdot h$$

$$F_A = \rho_{\text{vl}} \cdot g \cdot V$$

$$p \cdot V = n \cdot R \cdot T$$

$$C = \frac{Q}{\Delta T}$$

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

$$l = \frac{Q}{m}$$

$$|F| = k \frac{|Q_1| \cdot |Q_2|}{r^2}$$

$$E = \frac{F}{Q}$$

$$|E| = k \frac{|Q|}{r^2}$$

$$V = k \frac{Q}{r}$$

$$E = \frac{U}{d}$$

$$U = R \cdot I$$

$$R_s = R_1 + R_2$$

$$\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2}$$

$$Q = R \cdot I^2 \cdot \Delta t$$

$$P = U \cdot I$$

$$F = B \cdot I \cdot l \quad (\alpha = 90^\circ)$$

$$F = B \cdot Q \cdot v \quad (\alpha = 90^\circ)$$

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

$$B = \mu_0 \cdot \frac{N \cdot I}{l}$$

$$\Phi = B \cdot A \cdot \cos \alpha$$

$$U_i = -N \cdot \frac{\Delta \Phi}{\Delta t}$$

$$E = m \cdot c^2$$

$$E = h \cdot f$$

$$A_{\text{gemid}} = -\frac{\Delta N}{\Delta t}$$

$$A(t) = \lambda N(t)$$

$$N(t) = N_0 \cdot e^{-\lambda t} = N_0 \cdot 2^{-t/T_{1/2}}$$

$$\lambda = \frac{0,693}{T_{1/2}}$$

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

$$f = \frac{1}{T}$$

$$V_{\text{bol}} = 4 \cdot \pi \cdot R^3 / 3$$

Numerieke gegevens

$$n_{\text{glas}} = 1,50 \quad n_{\text{plexi}} = 1,49 \quad n_{\text{water}} = 1,33 \quad c = 2,998 \cdot 10^8 \text{ ms}^{-1}$$

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

$$\vartheta = -273 \text{ }^\circ\text{C} \Leftrightarrow T = 0 \text{ K}$$

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

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

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

$$\rho_{\text{water}} = 1,00 \cdot 10^3 \text{ kg m}^{-3}$$

$$\rho_{\text{kwik}} = 13,6 \cdot 10^3 \text{ kg m}^{-3}$$

$$\rho_{\text{lucht}} = 1,29 \text{ kg m}^{-3}$$

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

$$c_{\text{water}} = 4,19 \cdot 10^3 \text{ J kg}^{-1} \text{ K}^{-1}$$

$$c_{\text{ijs}} = 2,09 \cdot 10^3 \text{ J kg}^{-1} \text{ K}^{-1}$$

$$c_{\text{stoom}} = 2,01 \cdot 10^3 \text{ J kg}^{-1} \text{ K}^{-1}$$

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

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

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

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

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

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

$$1 \text{ eV} = 1,60 \cdot 10^{-19} \text{ J}$$

$$e = 1,60 \cdot 10^{-19} \text{ C}$$

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

$$c = 299\,792\,458 \text{ m} \cdot \text{s}^{-1} \quad h = 6,626 \cdot 10^{-34} \text{ J} \cdot \text{s} \quad 1 \text{ eV} = 1,602 \cdot 10^{-19} \text{ J}$$