Formelark til fysikk-OL

Mekanikk

$$\vec{v}(t) = \vec{s}\,'(t)$$

$$\vec{a}(t) = \vec{v}\,'(t)$$

$$v = v_0 + at$$

$$s = v_0 t + \frac{1}{2}at^2$$

$$2as = v^2 - v_0^2$$

$$x = v_{0x}t + \frac{1}{2}a_x t^2, \quad v_x = v_{0x} + a_x t$$

$$y = v_{0y}t + \frac{1}{2}a_y t^2, \quad v_y = v_{0y} + a_y t$$

$$a = \frac{v^2}{r} = \frac{4\pi^2 r}{T^2}$$

$$\sum \vec{F} = 0 \text{ hvis } \vec{v} = \text{konstant}$$

$$\sum \vec{F} = m\vec{a}$$

$$\vec{p} = m\vec{v}$$

$$W = \vec{F} \cdot \vec{s} = Fs\cos\alpha$$

$$E_k = \frac{1}{2}mv^2$$

$$E_p = mgh$$

$$E = E_p + E_k$$

$$P = \frac{W}{t} = \frac{E}{t}$$

$$P = Fv$$

$$F = kx$$

$$E_p = \frac{1}{2}kx^2$$

$$F = \gamma\frac{m_1 m_2}{r^2}$$

$$E_p = -\gamma\frac{Mm}{r}$$

Lys og bølger

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

$$v = f\lambda$$

$$S_2P - S_1P = n\lambda$$

Termofysikk

$$\rho = \frac{m}{V}$$

$$\Delta U = Q + W$$

$$M = \sigma T^4$$

$$\lambda_{\text{topp}} = \frac{a}{T}$$

Elektromagnetisme

$$I = \frac{Q}{t}$$

$$U = \frac{W}{q}$$

$$R = \frac{U}{I}$$

$$P = UI$$

$$R_s = R_1 + R_2 + \ldots + R_n$$

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

$$F = k_e\frac{q_1 q_2}{r^2}$$

$$\vec{F} = q\vec{E}$$

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

$$E_p = k_e\frac{Qq}{r}$$

$$F = qvB, \qquad \vec{F} = q\vec{v} \times \vec{B}$$

$$F = IlB, \qquad \vec{F} = I\vec{l} \times \vec{B}$$

$$B = k_m\frac{I}{r}$$

$$\Phi = \vec{B} \cdot \vec{A} = BA\cos\alpha$$

$$\epsilon = -\frac{\Delta\Phi}{\Delta t} = -\Phi'(t)$$

$$\epsilon = vBl$$

$$\omega = 2\pi f$$

$$U = U_m \sin\omega t, \text{ der } U_m = nBA\omega$$

$$U_s I_s = U_p I_p$$

$$\frac{U_s}{U_p} = \frac{N_s}{N_p}$$

$$F_m = l_m\frac{I_1 I_2}{r}l$$

Relativitet og kvantefysikk

$$t = \frac{t_0}{\sqrt{1-(v/c)^2}}$$

$$p = \frac{mv}{\sqrt{1-(v/c)^2}}$$

$$E = \frac{mc^2}{\sqrt{1-(v/c)^2}}$$

$$E_0 = mc^2$$

$$E_k = E - mc^2$$

$$E_f = hf$$

$$hf = W + E_k$$

$$hf_{\text{maks}} = eU$$

$$p_f = \frac{E}{c} = \frac{h}{\lambda}$$

$$\Delta x\Delta p \geq \frac{h}{4\pi}, \quad \Delta t\Delta E \geq \frac{h}{4\pi}$$

$$\lambda = \frac{h}{p}$$

$$v = Hr$$

Noen konstanter

$$c = 299792458 \text{ m/s}$$

$$k_e = 8.9875517923(14) \cdot 10^9 \text{ N m}^2/\text{C}^2$$

$$k_m = 2 \cdot 10^{-7} \text{ kg m/A}^2\text{s}^2$$

$$\mu_0 = 4\pi \cdot 10^{-7} \text{ kg m/A}^2\text{s}^2$$

$$\epsilon_0 = 8.854187817 \cdot 10^{-12} \text{ A}^2\text{s}^4/\text{kg m}^3$$

$$e = 1.6021766208(98) \cdot 10^{-19} \text{ C}$$

$$m_e = 9.10938356(11) \cdot 10^{-31} \text{ kg}$$
$$= 0.5109989461(31) \text{ MeV/c}^2$$

$$m_p = 1.672621898(21) \cdot 10^{-27} \text{ kg}$$
$$= 938.2720813(58) \text{ MeV/c}^2$$

$$m_n = 1.674927471(21) \cdot 10^{-27} \text{ kg}$$
$$= 939.5654133(58) \text{ MeV/c}^2$$

$$u = 1.660539040(20) \cdot 10^{-27} \text{ kg}$$

$$\gamma = 6.67408(31) \cdot 10^{-11} \text{ m}^3/\text{kg s}^2$$

$$h = 6.626070040(81) \cdot 10^{-34} \text{ Js}$$

$$N_A = 6.022140857(74) \cdot 10^{23}\text{mol}^{-1}$$

$$R = 8.3144598(48) \text{ J/Kmol}$$

$$k_B = 1.38054852(79) \cdot 10^{-23} \text{ J/K}$$

$$\sigma = 5.670367(13) \cdot 10^{-8} \text{ W/m}^2\text{K}^4$$