Неравномерное

$$v_{ср} = \frac{s}{t}$$

Равноускоренное

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

$$s_x = x - x_0$$

$$s_x = v_{0_x} t + \frac{a_x t^2}{2}$$

$$a_x = \frac{v - v_0}{t}$$

$$v_x = v_{0x} + a_x t$$

$$s_x = \frac{v_x^{\,2} - v_{0x}^{\,2}}{2a_x}$$

Движение по окружности

$$n = \frac{N}{t}$$

$$v = \frac{2pR}{T} = wR$$

$$w = \frac{2p}{T} = \frac{v}{R} = 2pn = \frac{\Delta j}{\Delta t}$$

$$a_{ц.с} = \frac{v^2}{R} = w^2 R$$

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

$$\vec{N} + m\vec{g} = m\vec{a}_{ц.с}$$

Тело брошено под углом к горизонту

$$v_x = v_0 \cos a$$

$$v_y = v_{0y} - gt = v_0 \sin a - gt$$

$$x = v_{0x}t = v_0 t \cos a$$

$$y = v_{0y}t - \frac{gt^2}{2} = v_0 t \sin a - \frac{gt^2}{2}$$

Динамика

$$F = ma$$

$$\vec{F}_1 = -\vec{F}_2$$

$$F_{тр} = mN$$

$$(F_{упр})_x = -k\Delta x$$

$$\vec{N} + m\vec{g} = m\vec{a}$$

$$N = P$$

$$P = m(g \pm a)$$

$$F = G\frac{m_1 m_2}{R^2}$$

$$v^2 = G\frac{M_3}{R+h}$$

$$v^2_{1к} = \frac{GM_3}{R_з} = gR_з$$

$$G = 6{,}67 \cdot 10^{-11} Нм^2/кг^2$$

Импульс

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

$$\vec{F}t = \vec{p}_2 - \vec{p}_1$$

$$F_x t = p_{2x} - p_{1x}$$

$$F_x t = mv_x - mv_{0x}$$

Давление

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

$$p = r_{ж} gh$$

$$p = p_a + r_{ж} gh$$

$$p_a \approx 10^5 Па$$

$$F_a = r_{ж} g V_{тела}$$

Законы сохранения

$$m_1\vec{v}_1 + m_2\vec{v}_2 = m_1\vec{v}_1` + m_2\vec{v}_2`$$

$$E_{k1} + E_{p1} = E_{k2} + E_{p2}$$

$$\frac{mv_1^2}{2} + mgh_1 = \frac{mv_2^2}{2} + mgh_2$$

$$E_p = mgh$$

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

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

Молекулярная физика

$$N_A = 6{,}022 \cdot 10^{23} моль^{-1}$$

$$n = \frac{N}{N_A} = \frac{m}{M} = \frac{Nm_0}{M}$$

$$k = 1{,}38 \cdot 10^{-23} \frac{Дж}{K}$$

$$p = \frac{1}{3} m_0 n v^2$$

$$p = \frac{2}{3} nE$$

$$p = nkT$$

$$p = \frac{1}{3} r \cdot v^2$$

$$n = \frac{N}{V}$$

$$T = 273 + t^0$$

$$E = \frac{3}{2} kT$$

$$M = M_r \cdot 10^{-3} \frac{кг}{моль}$$

$$M = m_0 N_A$$

$$\bar{v} = \sqrt{\frac{3kT}{m_0}} = \sqrt{\frac{3RT}{M}}$$

$$pV = \frac{m}{M} RT = nRT$$

$$\frac{p_1 V_1}{T_1} = \frac{p_2 V_2}{T_2}$$

$$R = kN_A$$

$$k = 1{,}38 \cdot 10^{-23} \frac{Дж}{K}$$

$$R = 8{,}31 \frac{Дж}{моль \cdot K}$$

Термодинамика

$$\varphi = \frac{p}{p_0} 100\%$$

$$Q = cm \cdot (T_2 - T_1)$$

$$Q = \pm rm$$

$$Q = \pm \lambda m$$

$$Q = qm$$

$$Q_1 + Q_2 + \cdots + Q_n = 0$$

$$\Delta U = A + Q$$

$$Q = \Delta U + A`$$

$$U = \frac{3}{2}\frac{m}{M} RT$$

$$A` = p\Delta V$$

$$A` = |Q_1| - |Q_2|$$

$$\eta = \frac{A`}{|Q_1|} = \frac{|Q_1| - |Q_2|}{|Q_1|}$$

$$\eta_{max} = \frac{T_1 - T_2}{T_1}$$

Электродинамика

$$q_1 + q_2 + \cdots + q_n = const$$

$$F = k\frac{q_1 q_2}{e \cdot r^2}$$

$$k = \frac{1}{4pe_0}$$

$$e_0 = 8{,}85 \cdot 10^{-12} \frac{Ф}{м}$$

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

$$E = k\frac{q}{e \cdot r^2}$$

$$\vec{E} = \vec{E}_1 + \vec{E}_2 + \ldots + \vec{E}_n$$

$$W = qEd$$

$$A = -(W_{n2} - W_{n1}) = qE\Delta d$$

$$j = \frac{W_n}{q} = Ed$$

$$j_1 - j_2 = U$$

$$A = qU$$

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

Конденсаторы

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

$$C = \frac{e_0 \cdot e \cdot S}{d}$$

$$e = \frac{C}{C_0}$$

последовательное

$$q = q_1 = q_2$$

$$U = U_1 + U_2$$

$$\frac{1}{C} = \frac{1}{C_1} + \frac{1}{C_2}$$

параллельное

$$q = q_1 + q_2$$

$$U = U_1 = U_2$$

$$C = C_1 + C_2$$

Ток

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

$R=r\frac{l}{S}$

$r=r_0(1+at)$

$R=R_0(1+at)$

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

$I=\frac{E}{R+r}$

$E=\frac{A_{ст}}{q}$

$E=IR+Ir$

$A=IUt$

$P=\frac{A}{t}=IU$

$Q=I^2Rt$

$m=kIt$

$k=\frac{M}{n\cdot e\cdot N_A}$

Последовательное

$I=I_1=I_2$

$U=U_1+U_2$

$R=R_1+R_2$

$\frac{U_1}{U_2}=\frac{R_1}{R_2}$

Параллельное

$U=U_1=UI_2$

$I=I_1+IU_2$

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

$\frac{I_1}{I_2}=\frac{R_2}{R_1}$

Колебания

$T=2p\sqrt{\frac{l}{g}}$

$T=2p\sqrt{LC}$

$T=2p\sqrt{\frac{m}{k}}$

$x=A\sin(wt+j_0)$

$E=\frac{mv^2}{2}+\frac{kx^2}{2}$

$W=\frac{Li^2}{2}+\frac{q^2}{2C}$

$w_0^2=\frac{1}{LC}$

$X_C=\frac{1}{wC}$

$X_L=wL$

Волны

$v=\frac{l}{T}=ln$

$w=2pn=\frac{2p}{T}$

Оптика

$n_1=\frac{c}{v_1}$

$n=\frac{\sin a}{\sin b}=\frac{v_1}{v_2}=\frac{n_2}{n_1}$

$\frac{1}{F}=\frac{1}{d}+\frac{1}{f}$

$D=\frac{1}{F}$

$\Gamma=\frac{f}{d}=\frac{H}{h}$

$sin\alpha_0=\frac{1}{n}=\frac{v_2}{v_1}$

условие max

$\Delta d=k\lambda$

условие min

$\Delta d=(2k+1)\frac{\lambda}{2}$

дифракц. реш.

$d\sin\varphi=k\lambda$

$d=a+b$

Электромагнетизм

$\Phi=BS\cos wt$

$E_i=-\frac{\Delta\Phi}{\Delta t}$

$F_a=IBL\sin a$

$\Phi=BS\cos a$

$F_л=Bqv\sin a$

$\Phi_s=LI$

$E_{is}=-\frac{\Delta\Phi}{\Delta t}=-L\frac{\Delta I}{\Delta t}$

$E_i=BLv\sin a$

$\mu=\frac{B}{B_0}$

трансформатор

$\frac{U_1}{U_2}\approx\frac{E_1}{E_2}=\frac{N_1}{N_2}=K$

Атомная и ядерная физика

$E_0=hv$

$hv=A_{вых}+\frac{m_ev^2}{2}$

$hv=E_n-E_k$

$E_{св}=\Delta mc^2$

$\Delta m=(Zm_p+Nm_n)-M_я$

$A=Z+N$

$N=N_02^{-\frac{t}{T}}$

${}^A_ZX={}^0_{-1}e+{}^{A}_{Z+1}Y$

${}^A_ZX={}^4_2Ne+{}^{A-4}_{Z-2}Y$