Кинематика

$$v=\frac{S}{t}\ ::\ x=x_0\pm v\cdot t$$

$$S=x-x_0=v\cdot t$$

$$a=\frac{\Delta v}{t}=\frac{v-v_0}{t}$$

$$v=\pm v_0\pm a\cdot t$$

$$x=x_0\pm v_0\cdot t\pm\frac{a\cdot t^2}{2}$$

$$S=x-x_0=$$

$$=v_0\cdot t+\frac{a\cdot t^2}{2}$$

$$v^2-v_0^2=\pm 2a\cdot S$$

$$\Delta j=j_2-j_1$$

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

$$n=\frac{1}{T}\ ::\ S=\Delta j\cdot R$$

$$v=\frac{S}{t}=\frac{\Delta j\cdot R}{t}=w\cdot R$$

$$a_{ц}=\frac{v^2}{R}=w^2\cdot R$$

Динамика

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

$$\vec{F}\cdot\Delta t=\Delta(m\cdot\vec{v})$$

$$F_{тяг}=G\frac{m_1\cdot m_2}{r^2}$$

$$F_{тяж}=mg$$

$$v_{первая\_космическая}=$$

$$=\sqrt{\frac{G\cdot m_з}{R_з}}\approx 7{,}9км/с$$

$$F_{тр}=m\cdot N$$

$$\vec{F}_{упр}=-k\Delta\vec{x}$$

$$M=F\cdot d$$

Законы сохранения

$$\vec{F}\cdot\Delta t=\Delta\vec{p}$$

$$A=F\cdot S\cdot\cos a$$

$$N=\frac{A}{\Delta t}\ ::\ h=\frac{A}{W}$$

$$W_k=\frac{mv^2}{2}\ ::\ W_p=mgh$$

Механика жидкостей

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

$$p=rgh$$

$$\frac{h_1}{h_2}=\frac{r_2}{r_1}$$

$$F_A=r_{ж}V_{П}g$$

Колебания и волны

$$n=1/T\ ::\ F_{УПР}=ma$$

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

$$v=x'=X_m w\cos(wt+j_0)$$

$$a=x''=-X_m w^2\sin(wt+j_0)$$

$$w=\sqrt{\frac{k}{m}}=\sqrt{\frac{g}{l}}$$

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

$$W_K=\frac{mX_m^2w}{2}\cos^2(wt+j_0)$$

$$W_P=\frac{kX_m^2}{2}\sin^2(wt+j_0)=$$

$$=\frac{mX_m^2w^2}{2}\sin^2(wt+j_0)$$

$$W=\frac{mX_m^2}{2}\ ::\ l=n_e T$$

$$x=X_m\sin(wt-kl)$$

Основы МКТ

$$W_{ср}=\frac{m_0v_{ск}^2}{2}$$

$$n=\frac{N}{V}\ ::\ p=\frac{2}{3}nW_{ср}\ ::\ W_{ср}=\frac{3}{2}kT$$

$$v_{ск}=\sqrt{\frac{3kT}{m_0}}=\sqrt{\frac{3kN_AT}{m}}=\sqrt{\frac{3RT}{m}}$$

$$p=\frac{nRT}{V}\ ::\ pV=\frac{m}{m}RT$$

Термодинамика

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

$$\Delta U=\frac{3}{2}\cdot\frac{m}{m}\cdot R\cdot\Delta T$$

$$\Delta U=\frac{3}{2}p\Delta V\ ::\ \Delta U=\frac{3}{2}\Delta pV$$

$$A=p\Delta V\ ::\ Q=\Delta U+A$$

$$\Delta Q=C_T\Delta T\ ::\ \Delta Q=cm\Delta T$$

$$h=\frac{A}{Q_1}=\frac{Q_1-|Q_2|}{Q_1}=1-\frac{|Q_2|}{Q_1}$$

$$h=\frac{T_1-T_2}{T_1}=1-\frac{T_2}{T_1}$$

$$Q=lm\ ::\ Q=rm$$

Оптика

$$n=\frac{c}{n_C}\ ::\ \frac{l_1}{n_1}=\frac{l_2}{n_2}$$

$$n_1l_1=n_2l_2$$

$$n_1\sin a=n_2\sin g$$

$$a_{ПР}=\arcsin\frac{n_2}{n_1}$$

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

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

$$\Delta\Phi=2p\frac{\Delta l}{l}$$

$$\Delta l=2k(l/2)$$

$$\Delta l=(2k+1)(l/2)$$

$$d\sin j_k=\pm kl$$

$$d=\frac{N}{l}$$

Электростатика

$$F=k\frac{|q_1q_2|}{r^2}$$

$$W_p=k\frac{q_1\cdot q_2}{r}=Fd=qEd$$

$$j=\frac{W_p}{q}=k\frac{q}{r}=Ed$$

$$A=-\Delta W_p=q(j_1-j_2)$$

$$q=CU$$

$$C=\frac{ee_0S}{d}$$

$$W=\frac{CU^2}{2}=\frac{q^2}{2C}=\frac{qU}{2}$$

$$W_p=\frac{qj}{2}$$

Постоянный ток

$$I=\frac{\Delta q}{\Delta t}\ ::\ R=r\frac{l}{S}\ ::\ U=j_1-j_2$$

$$I=\frac{U}{R}\ ::\ I=\frac{e}{R+r}$$

$$A=\Delta qU=IU\Delta t=\frac{U^2}{R}\Delta t=I^2R\Delta t$$

$$N=\frac{A}{\Delta t}=IU=\frac{U^2}{R}=I^2R$$

$$Q=A=IU\Delta t=\frac{U^2}{R}\Delta t=I^2R\Delta t$$

Электромагнитные к-я

$$q=q_m\cos(wt+j_0)$$

$$I=-q_mw\sin(wt+j_0)$$

$$W_Э=\frac{q^2}{2C}\ ::\ W_M=\frac{LI^2}{2}$$

$$e=e_m\cos wt$$

$$I=I_m\cos wt$$

$$U_R=IR=I_m\cos wt$$

$$U_L=I_mLw\cos(wt+p/2)$$

$$q=\frac{I_m}{w}\cos(wt-p/2)$$

$$U_C=I_m\frac{1}{Cw}\cos(wt-p/2)$$

$$w=\frac{1}{\sqrt{LC}}$$

$$T=\frac{2p}{w}=2p\sqrt{LC}$$

Индукция

$$F_Л=qvB\sin a$$

$$F_A=IlB\sin a$$

$$M=IlBa\sin a=ISB\sin a$$

$$\Phi=BS\cos a$$

$$H=\frac{I}{2pr}$$

$$e_{И}=-N\frac{\Delta\Phi}{\Delta t}$$

$$e_C=-L\frac{\Delta I}{\Delta t}$$

$$W_M=\frac{LI^2}{2}=\frac{\Phi I}{2}=\frac{\Phi^2}{2L}$$

Квантовая физика.

$$e=hn=\frac{hc}{l}$$

$$e=mc^2$$

$$m=\frac{e}{c^2}=\frac{hn}{c}=\frac{hc}{c^2l}=\frac{h}{cl}$$

$$p=mc=\frac{hn}{c}=\frac{h}{l}$$

$$hn_0=\frac{hc}{l_0}=A+0$$

$$n_0=\frac{A}{h}$$

$$l_0=\frac{hc}{A}$$

$$hn=A+eU_З$$

Ядерные реакции.

$$mn_nr_n=\frac{h}{2p}n$$

$$n=\frac{E_1-E_2}{h}$$

$$n_{\min}=R\left(\frac{1}{n^2}-\frac{1}{m^2}\right)$$

$$E_Я=E_H-E_{CB}$$

$$\Delta m=m_H-m_Я=$$

$$=(Zm_P+Nm_n)-m_Я$$

$$\Delta E=\Delta mc^2=$$

$$=\Delta m\cdot 931{,}5(МэВ)=$$

$$=(m_{до}-m_{после})\cdot$$

$$\cdot 931{,}5(МэВ)$$

$$N=N_0\,2^{\frac{1}{T_{1/2}}}$$

Основы СТО.

$$l=l_0\sqrt{1-(n/c)^2}$$

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

$$v=\frac{v_1+v_2}{1+v_1v_2/c}$$

$$\vec{p}=\frac{m_0\vec{v}}{\sqrt{1-(v/c)^2}}$$

$$m=\frac{m_0}{\sqrt{1-(v/c)^2}}$$

$$\Delta E=\Delta mc^2$$

$$E=mc^2$$

$$W_K=m_0c^2\left(\frac{1}{\sqrt{1-(v/c)^2}}-1\right)$$