FIZIKA

Valstybinio brandos egzamino užduoties

PRIEDAS

FORMULĖS

1. Judėjimas ir jėgos

$\vec{v} = \frac{\vec{s}}{t}, \vec{a} = \frac{\vec{v} - \vec{v}_0}{t}, a = \frac{v^2}{R}, s_x = v_{0x}t + \frac{a_x t^2}{2}, \vec{F} = m\vec{a}, F = mg, \vec{P} = m(\vec{g} - \vec{a}), F = \mu N, \ F = kx,$

$F = \rho_{\text{sk}} V g, F = G\frac{m_1 m_2}{R^2}, g = G\frac{M}{(R+r)^2}, \vec{p} = m\vec{v}, \vec{F}\Delta t = m\Delta\vec{v}, m_1\vec{v}_{01} + m_2\vec{v}_{02} = m_1\vec{v}_1 + m_2\vec{v}_2.$

2. Energija

$E_{\text{k}} = \frac{mv^2}{2}, \ E_{\text{p}} = mgh, \ E_{\text{p}} = \frac{kx^2}{2}, A = Fs\cos\alpha, N = \frac{A}{t}, A = E_{\text{k2}} - E_{\text{k1}}, \ A = E_{\text{p1}} - E_{\text{p2}},$

$\eta = \frac{A_{\text{n}}}{A_{\text{v}}} \cdot 100\ \%.$

3. Šiluminiai reiškiniai

$M = m_0 N_{\text{A}}, N = \frac{m}{M}N_{\text{A}}, \rho = \frac{m}{V}, n = \frac{N}{V}, p = \frac{F}{S}, p = \frac{1}{3}m_0 n\overline{v^2}, \bar{E}_{\text{k0}} = \frac{3}{2}kT, T = t + 273, pV = \frac{m}{M}RT,$

$U = \frac{3}{2}\frac{m}{M}RT, Q = cm\Delta t, Q = \lambda m, Q = Lm, Q = qm, A' = p\Delta V, \Delta U = A + Q, \eta_{\max} = \frac{T_1 - T_2}{T_1},$

$\eta = \frac{A'}{|Q_1|}.$

4. Elektra ir magnetizmas

$F = k\frac{q_1 q_2}{r^2}, \ \vec{E} = \frac{\vec{F}}{q}, \ \ E = \frac{U}{\Delta d}, \ A = qEd, \ C = \frac{q}{U}, \ C = \frac{\varepsilon\varepsilon_0 S}{d}, \ W = \frac{CU^2}{2}, \ \varepsilon = \frac{F_0}{F}, \ \varepsilon = \frac{E_0}{E}, \ \varphi = \frac{W_{\text{p}}}{q}, \ I = \frac{q}{t},$

$I = \frac{U}{R}, \quad R = \rho\frac{l}{S}, \quad E = \frac{A_{\text{paš}}}{q}, \quad I = \frac{E}{R+r}, \quad I = I_1 = I_2, \quad U = U_1 + U_2, \quad R = R_1 + R_2, \quad I = I_1 + I_2,$

$U = U_1 = U_2, \ \frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2}, A = IUt, P = \frac{A}{t}, F = BIl\sin\alpha, \ F = qvB\sin\alpha, \mu = \frac{B}{B_0}, \Phi = BS\cos\alpha,$

$E = N\left|\frac{\Delta\Phi}{\Delta t}\right|, E = L\left|\frac{\Delta I}{\Delta t}\right|, W = \frac{LI^2}{2}, q = q_{\text{m}}\cos(\omega t), T = 2\pi\sqrt{LC}, i = I_{\text{m}}\sin(\omega t), u = U_{\text{m}}\cos(\omega t),$

$I = \frac{I_{\text{m}}}{\sqrt{2}}, \ U = \frac{U_{\text{m}}}{\sqrt{2}}, X_{\text{C}} = \frac{1}{\omega C}, \ X_L = \omega L, \ K = \frac{N_1}{N_2} = \frac{U_1}{U_2}.$

5. Svyravimai ir bangos

$x = x_{\mathrm{m}} \cos(\omega\, t)$, $\varphi = \omega t$, $T = 2\pi\sqrt{\frac{l}{g}}$, $T = 2\pi\sqrt{\frac{m}{k}}$, $\omega = 2\pi f$, $v = \lambda f$.

6. Šviesa

$\frac{n_2}{n_1} = \frac{\sin\alpha}{\sin\beta}$, $\frac{v_1}{v_2} = \frac{n_2}{n_1}$, $\pm\frac{1}{F} = \frac{1}{d} \pm \frac{1}{f}$, $\Delta d = k\lambda$, $\Delta d = (2k+1)\frac{\lambda}{2}$, $d\sin\varphi = k\lambda$.

7. Atomas, branduolys ir elementariosios dalelės

$E = hf$, $hf = A_{\text{iš}} + \frac{mv^2}{2}$, $hf_{\min} = A_{\text{iš}}$, $eU_{\mathrm{s}} = \frac{mv^2}{2}$, $E = mc^2$, $A = Z + N$, $f = \frac{|E_{\mathrm{k}} - E_{\mathrm{n}}|}{h}$,
$E_{\mathrm{r}} = \Delta M c^2 = (Zm_{\mathrm{p}} + Nm_{\mathrm{n}} - M_{\mathrm{b}})c^2$, $N = N_0 2^{-t/T}$.

8. Reliatyvumo teorijos pagrindai

$t = \frac{t_0}{\sqrt{1 - \frac{v^2}{c^2}}}$, $l = l_0\sqrt{1 - \frac{v^2}{c^2}}$, $m = \frac{m_0}{\sqrt{1 - \frac{v^2}{c^2}}}$, $v = \frac{v_1 + v_2}{1 + \frac{v_1 v_2}{c^2}}$.

PAGRINDINĖS KONSTANTOS

Gravitacijos konstanta	$G = 6{,}672 \cdot 10^{-11}\ \mathrm{N\cdot m^2/kg^2}$
Šviesos greitis vakuume	$c = 2{,}9979 \cdot 10^{8}\ \mathrm{m/s}$
Avogadro konstanta	$N_{\mathrm{A}} = 6{,}022 \cdot 10^{23}\ \mathrm{mol^{-1}}$
Bolcmano konstanta	$k = 1{,}3807 \cdot 10^{-23}\ \mathrm{J/K}$
Universalioji dujų konstanta (molinė)	$R = kN_{\mathrm{A}} = 8{,}314\ \mathrm{J/(mol\cdot K)}$
Elektrinė konstanta	$\varepsilon_0 = 8{,}854 \cdot 10^{-12}\ \mathrm{F/m}$
Elementarusis krūvis	$e = 1{,}602 \cdot 10^{-19}\ \mathrm{C}$
Planko konstanta	$h = 6{,}626 \cdot 10^{-34}\ \mathrm{J\cdot s} = 4{,}136 \cdot 10^{-15}\ \mathrm{eV\cdot s}$
Masės ir energijos sąryšio koeficientas	931,5 MeV/a. m. v. $1\ \mathrm{eV} = 1{,}6 \cdot 10^{-19}\ \mathrm{J}$