
FIZIKA

2019 m. valstybinio brandos egzamino užduoties

PRIEDAS

PAGRINDINĖS KONSTANTOS

Elementarusis elektros krūvis	$e = 1,602 \cdot 10^{-19} \text{ C}$
Šviesos greitis vakuume	$c = 2,9979 \cdot 10^8 \text{ m/s}$
Gravitacijos konstanta	$G = 6,672 \cdot 10^{-11} \text{ N} \cdot \text{m}^2/\text{kg}^2$
Elektrinė konstanta	$\epsilon_0 = 8,854 \cdot 10^{-12} \text{ F/m}$
Planko konstanta	$h = 6,626 \cdot 10^{-34} \text{ J} \cdot \text{s} = 4,136 \cdot 10^{-15} \text{ eV} \cdot \text{s}$
Avogadro skaičius	$N_A = 6,022 \cdot 10^{23} \text{ mol}^{-1}$
Bolcmano konstanta	$k = 1,3807 \cdot 10^{-23} \text{ J/K}$
Universalioji dujų konstanta (molinė)	$R = kN_A = 8,314 \text{ J}/(\text{mol} \cdot \text{K})$
Masės ir energijos sąryšio koeficientas	931,5 MeV/a. m. v. $1 \text{ eV} = 1,6 \cdot 10^{-19} \text{ J}$

FIZIKOS BRANDOS EGZAMINO FORMULĖS

1. Judėjimas ir jėgos. $\vec{v} = \frac{\vec{s}}{t}$, $\vec{a} = \frac{\vec{v} - \vec{v}_0}{t}$, $s_x = v_{0x}t + \frac{a_x t^2}{2}$, $v = \frac{2\pi R}{T}$, $a = \frac{v^2}{R}$, $f = \frac{1}{T}$, $\vec{F} = m\vec{a}$,
 $F = mg$, $\vec{P} = m(\vec{g} - \vec{a})$, $F = \mu N$, $F = kx$, $F = G \frac{m_1 m_2}{R^2}$, $g = G \frac{M}{(R+r)^2}$, $v_1 = \sqrt{Rg}$, $F = \rho_{sk} Vg$,
 $\vec{p} = m\vec{v}$, $\vec{F}\Delta t = m\Delta\vec{v}$, $m_1 \vec{v}_{01} + m_2 \vec{v}_{02} = m_1 \vec{v}_1 + m_2 \vec{v}_2$, $E_k = \frac{mv^2}{2}$, $E_p = mgh$, $E_p = \frac{kx^2}{2}$, $A = F \cos \alpha$,
 $N = \frac{A}{t}$, $A = E_{k2} - E_{k1}$, $A = E_{p1} - E_{p2}$, $\eta = \frac{A_n}{A_v} \cdot 100\%$.

2. Makrosistemų fizika. $M = m_0 N_A$, $N = \frac{m}{M} N_A$, $\rho = \frac{m}{V}$, $n = \frac{N}{V}$, $p = \frac{F}{S}$, $p = \frac{1}{3} m_0 n \overline{v^2}$,
 $\bar{E}_{k0} = \frac{3}{2} kT$, $T = t + 273$, $pV = \frac{m}{M} RT$, $\varphi = \frac{p}{p_0} \cdot 100\% = \frac{\rho}{\rho_0} \cdot 100\%$, $F = \sigma l$, $p = \rho gh$, $h = \frac{2\sigma}{\rho g r}$,
 $\sigma = E|\varepsilon_0|$, $\varepsilon_0 = \frac{\Delta l}{l_0}$, $\sigma = \frac{F}{S}$, $U = \frac{3}{2} \frac{m}{M} RT$, $Q = cm\Delta t$, $Q = \lambda m$, $Q = Lm$, $Q = qm$, $A' = p\Delta V$,
 $\Delta U = A + Q$, $\eta_{\max} = \frac{T_1 - T_2}{T_1}$, $\eta = \frac{A'}{|Q_1|}$.

3. Elektra ir magnetizmas. $F = k \frac{|q_1| \cdot |q_2|}{r^2}$, $\vec{E} = \frac{\vec{F}}{q}$, $E = \frac{U}{\Delta d}$, $A = qEd$, $C = \frac{q}{U}$, $C = \frac{\varepsilon \varepsilon_0 S}{d}$,
 $W = \frac{CU^2}{2}$, $C = C_1 + C_2 + \dots + C_n$, $\frac{1}{C} = \frac{1}{C_1} + \frac{1}{C_2} + \dots + \frac{1}{C_n}$, $\varepsilon = \frac{F_0}{F}$, $\varepsilon = \frac{E_0}{E}$, $\varphi = \frac{W_p}{q}$, $I = \frac{q}{t}$, $I = \frac{U}{R}$,
 $R = \rho \frac{l}{S}$, $E = \frac{A_{pas}}{q}$, $I = \frac{E}{R+r}$, $I = I_1 = I_2$, $U = U_1 + U_2$, $R = R_1 + R_2$, $I = I_1 + I_2$, $U = U_1 = U_2$,
 $\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2}$, $A = IUt$, $P = \frac{A}{t}$, $m = kI\Delta t$, $F = BIl \sin \alpha$, $F = qvB \sin \alpha$, $\mu = \frac{B}{B_0}$, $\Phi = BS \cos \alpha$,
 $E = N \left| \frac{\Delta \Phi}{\Delta t} \right|$, $E = L \left| \frac{\Delta I}{\Delta t} \right|$, $W = \frac{LI^2}{2}$.

4. Svyravimai ir bangos. $x = x_m \cos \omega t$, $\varphi = \omega t$, $T = 2\pi \sqrt{\frac{l}{g}}$, $T = 2\pi \sqrt{\frac{m}{k}}$, $\omega = 2\pi f$, $q = q_m \cos \omega t$,
 $T = 2\pi \sqrt{LC}$, $i = I_m \sin \omega t$, $u = U_m \cos \omega t$, $I = \frac{I_m}{\sqrt{2}}$, $U = \frac{U_m}{\sqrt{2}}$, $X_C = \frac{1}{\omega C}$, $X_L = \omega L$, $K = \frac{N_1}{N_2} = \frac{U_1}{U_2}$,
 $v = \lambda f$, $\Delta d = k\lambda$, $\Delta d = (2k+1) \frac{\lambda}{2}$, $d \sin \varphi = k\lambda$, $\frac{n_2}{n_1} = \frac{\sin \alpha}{\sin \beta}$, $\frac{v_1}{v_2} = \frac{n_2}{n_1}$, $\pm D = \pm \frac{1}{F} = \frac{1}{d} \pm \frac{1}{f}$.

5. Modernioji fizika. $E = hf$, $hf = A_{is} + \frac{mv^2}{2}$, $hf_{\min} = A_{is}$, $eU_s = \frac{mv^2}{2}$, $E = mc^2$, $A = Z + N$,
 $f = \frac{|E_k - E_n|}{h}$, $E_r = \Delta M c^2 = (Zm_p + Nm_n - M_b) c^2$, $N = N_0 2^{-t/T}$.