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# FIZIKA

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	$k = 1,3807 \cdot 10^{-23} \text{J/K}$
Universaliųjų 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.  $\vec{v} = \frac{\vec{s}}{t}$ ,  $\vec{a} = \frac{\vec{v} - \vec{v}_0}{t}$ ,  $s_x = v_{0x}t + \frac{a_x t^2}{2}$ ,  $v = \frac{2\pi R}{T}$ ,  $a = \frac{v^2}{R}$ ,  $f = \frac{1}{T}$ ,  $\vec{F} = m\vec{a}$ ,  
 $F = mg$ ,  $\vec{P} = m(\vec{g} - \vec{a})$ ,  $F = \mu N$ ,  $F = kx$ ,  $F = G \frac{m_1 m_2}{R^2}$ ,  $g = G \frac{M}{(R+r)^2}$ ,  $v_1 = \sqrt{Rg}$ ,  $\left(\frac{T_1}{T_2}\right)^2 = \left(\frac{R_1}{R_2}\right)^3$ ,  
 $F = \rho_{sk} Vg$ ,  $\vec{p} = m\vec{v}$ ,  $\vec{F}\Delta t = m\Delta\vec{v}$ ,  $m_1\vec{v}_{01} + m_2\vec{v}_{02} = m_1\vec{v}_1 + m_2\vec{v}_2$ ,  $E_k = \frac{mv^2}{2}$ ,  $E_p = mgh$ ,  $E_p = \frac{kx^2}{2}$ ,  
 $A = F_s \cos\alpha$ ,  $N = \frac{A}{t}$ ,  $A = E_{k2} - E_{k1}$ ,  $A = E_{p1} - E_{p2}$ ,  $\eta = \frac{A_n}{A_s} \cdot 100\%$ .

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

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