

Matematikos, gamtos mokslų dalykų, informatikos ir inžinerinių technologijų valstybinių brandos egzaminų užduočių aprašo 3 priedas

FIZIKOS VALSTYBINIO BRANDOS EGZAMINO FORMULĖS IR PAGRINDINĖS KONSTANTOS

I SKYRIUS FORMULĖS

1. Judėjimas ir jėgos

$$\vec{v} = \frac{s}{t}, \vec{a} = \frac{\vec{v} - \vec{v}_0}{t}, a = \frac{v^2}{R}, s_x = v_{0x}t + \frac{a_x t^2}{2}, \vec{F} = m\vec{a}, F = mg, \vec{P} = m(\vec{g} - \vec{a}), F = \mu N, F = kx, F = \rho_{sk} Vg, F = G \frac{m_1 m_2}{R^2}, g = G \frac{M}{(R+r)^2}, \vec{p} = m\vec{v}, \vec{F} \Delta t = m \Delta \vec{v}, m_1 \vec{v}_{01} + m_2 \vec{v}_{02} = m_1 \vec{v}_1 + m_2 \vec{v}_2.$$

2. Energija

$$E_k = \frac{mv^2}{2}, E_p = mgh, E_p = \frac{kx^2}{2}, A = Fs \cos \alpha, N = \frac{A}{t}, A = E_{k2} - E_{k1}, A = E_{p1} - E_{p2}, \eta = \frac{A_n}{A_v} \cdot 100 \%$$

3. Šiluminiai reiškiniai

$$M = m_0 N_A, N = \frac{m}{M} N_A, \rho = \frac{m}{V}, n = \frac{N}{V}, p = \frac{F}{S}, p = \frac{1}{3} m_0 n \overline{v^2}, \bar{E}_{k0} = \frac{3}{2} kT, T = t + 273, pV = \frac{m}{M} RT, U = \frac{3}{2} \frac{m}{M} RT, Q = cm\Delta t, Q = \lambda m, Q = Lm, Q = qm, A' = p\Delta V, \Delta U = A + Q, \eta_{\max} = \frac{T_1 - T_2}{T_1}, \eta = \frac{A'}{|Q_1|}.$$

4. Elektra ir magnetizmas

$$F = k \frac{q_1 q_2}{r^2}, \vec{E} = \frac{\vec{F}}{q}, E = \frac{U}{\Delta d}, A = qEd, C = \frac{q}{U}, C = \frac{\epsilon \epsilon_0 S}{d}, W = \frac{CU^2}{2}, \epsilon = \frac{F_0}{F}, \epsilon = \frac{E_0}{E}, \Phi = \frac{W_p}{q}, I = \frac{q}{t}, I = \frac{U}{R}, R = \rho \frac{l}{S}, E = \frac{A_{paš}}{q}, I = \frac{E}{R+r}, I = I_1 = I_2, U = U_1 + U_2, R = R_1 + R_2, I = I_1 + I_2, U = U_1 = U_2, \frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2}, A = IUt, P = \frac{A}{t}, F = BIl \sin \alpha, F = qvB \sin \alpha, \mu = \frac{B}{B_0}, \Phi = BS \cos \alpha, E = N \left| \frac{\Delta \Phi}{\Delta t} \right|, E = L \left| \frac{\Delta I}{\Delta t} \right|, W = \frac{LI^2}{2}, q = q_m \cos \omega t, T = 2\pi \sqrt{LC}, i = I_m \sin \omega t, u = U_m \cos \omega t, I = \frac{I_m}{\sqrt{2}}, U = \frac{U_m}{\sqrt{2}}, X_C = \frac{1}{\omega C}, X_L = \omega L, K = \frac{N_1}{N_2} = \frac{U_1}{U_2}.$$

5. Svyravimai ir bangos

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

6. Šviesa

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

7. Atomas, branduolys ir elementariosios dalelės

$$E = hf, \quad hf = A_{i\check{s}} + \frac{mv^2}{2}, \quad hf_{\min} = A_{i\check{s}}, \quad eU_s = \frac{mv^2}{2}, \quad E = mc^2, \quad A = Z + N, \quad f = \frac{|E_k - E_n|}{h},$$

$$E_r = \Delta Mc^2 = (Zm_p + Nm_n - M_b)c^2, \quad N = N_0 2^{-t/T}.$$

8. Reliatyvumo teorijos pagrindai

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

II SKYRIUS PAGRINDINĖS KONSTANTOS

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