

# 1. IZPIT IZ FIZIKE II ZA ŠTUDENTE BIOKEMIJE

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## Teorija

1. Izpelji enačbo za delo, ki ga idealni plin opravi pri izotermni spremembi.  $1 \text{ m}^3$  plina pri tlaku  $1 \text{ bar}$  pri izotermni spremembi opravi  $1 \text{ kJ}$  dela. Za koliko % se pri tem spremeni njegova prostornina?
2. Izpelji nadomestno kapaciteto zaporedno vezanih kondenzatorjev. Koliko kondenzatorjev z dielektrično konstanto  $\varepsilon = 3$  moramo vezati zaporedno, da z njimi nadomestimo en sam enak, a prazen kondenzator?
3. Zapiši enačbo tanke leče. Kje nastane slika predmeta, ki se nahaja dve goriščni razdalji pred zbiralno lečo. Položaj slike določi tudi z risanjem poteka žarkov.

Enačbe

$$\begin{aligned}
 v &= \frac{ds}{dt} & a &= \frac{dv}{dt} & \omega &= \frac{d\varphi}{dt} & \alpha &= \frac{d\omega}{dt} \\
 s &= s_0 + vt & \varphi &= \varphi_0 + \omega t \\
 s &= s_0 + v_0 t + \frac{1}{2}at^2 & v &= v_0 + at & \varphi &= \varphi_0 + \omega_0 t + \frac{1}{2}\alpha t^2 & \omega &= \omega_0 + \alpha t \\
 \omega &= 2\pi\nu & v &= \omega r & a_r &= \frac{v^2}{r} & a_t &= \alpha r \\
 \vec{F} &= m\vec{a} & \vec{M} &= J\vec{\alpha} & \vec{M} &= \vec{r} \times \vec{F} \\
 F_g &= mg & F_{vzm} &= kx & F_{lep} &= k_{lep}F_p & F_{tr} &= k_{tr}F_p \\
 J_{valj} &= \frac{1}{2}mr^2 & J_{krogla} &= \frac{2}{5}mr^2 & J_{palica} &= \frac{1}{12}ml^2 & J_{točka} &= mr^2 & J &= J^* + mr^{*2} \\
 \Delta W &= A' & W_{kin} &= \frac{1}{2}mv^2 & W_{pot} &= mgh & W_{pr} &= \frac{1}{2}kx^2 & W_{rot} &= \frac{1}{2}J\omega^2 & A &= \vec{F} \cdot \vec{s} \\
 \Delta \vec{G} &= \vec{F}\Delta t & \vec{G} &= m\vec{v} \\
 \Delta \vec{\Gamma} &= \vec{M}\Delta t & \vec{\Gamma} &= \vec{r} \times \vec{G} = J\vec{\omega} \\
 \vec{r}^* &= \frac{\sum_i m_i \vec{r}_i}{\sum_i m_i} \\
 F_g &= \frac{Gm_1 m_2}{r^2} \\
 p &= p_0 + \rho gh & p + \frac{1}{2}\rho v^2 + \rho gh &= \text{konst.} \\
 F_{vzg} &= \rho V g \\
 F_u &= \frac{1}{2}C_u \rho S v^2 & F_u &= 6\pi\eta r v & Re &= \frac{l\rho v}{\eta} \\
 t_0 &= 2\pi\sqrt{\frac{l}{g}} & t_0 &= 2\pi\sqrt{\frac{m}{k}} & s &= s_0 \sin \omega t & \omega &= 2\pi\nu = \frac{2\pi}{t_0} \\
 c &= \lambda\nu & c &= \sqrt{\frac{F}{\rho S}} & s &= s_0 \sin(kx - \omega t) & k &= \frac{2\pi}{\lambda} \\
 s_1 - s_2 &= N\lambda & s_1 - s_2 &= \left(N + \frac{1}{2}\right)\lambda & d \sin \alpha &= N\lambda & d \sin \alpha &= \left(N + \frac{1}{2}\right)\lambda \\
 \frac{\Delta l}{l} &= \frac{1}{E} \frac{F}{S} & \frac{\Delta l}{l} &= \alpha \Delta T & \frac{\Delta V}{V} &= \beta \Delta T & \beta &= 3\alpha \\
 pV &= \frac{m}{M} RT & pV^\kappa &= \text{konst.} & \kappa &= \frac{c_p}{c_v} & c_p &= c_v + \frac{R}{M} & W_n &= mc_v T \\
 \Delta W &= A' + Q & A &= -\int_{V_1}^{V_2} p dV & Q &= mc \Delta T & Q &= C \Delta T & Q &= m q_t & Q &= m q_i \\
 \eta &= \frac{A_{opr}}{Q_{dov}} & \eta_C &= 1 - \frac{T_1}{T_2} \\
 P &= S \lambda \frac{\Delta T}{d} \\
 \vec{F}_e &= e\vec{E} & F_e &= \frac{e_1 e_2}{4\pi\epsilon\epsilon_0 d^2} & W_e &= eV & V &= \frac{e}{4\pi\epsilon\epsilon_0 d} \\
 E &= \frac{\sigma}{2\epsilon\epsilon_0} & E &= \frac{\sigma}{\epsilon\epsilon_0} & e &= CU & C &= \frac{\epsilon\epsilon_0 S}{d} & C &= C_1 + C_2 & \frac{1}{C} &= \frac{1}{C_1} + \frac{1}{C_2} & W_e &= \frac{e^2}{2C} \\
 U &= RI & R &= \frac{\xi l}{S} & R &= R_1 + R_2 & \frac{1}{R} &= \frac{1}{R_1} + \frac{1}{R_2} & P &= UI \\
 \mathbf{F} &= \Pi \times \mathbf{B} & B &= \frac{\mu_0 I}{2\pi r} & B &= \frac{\mu_0 NI}{l} & \mathbf{F} &= e\mathbf{E} + e\mathbf{v} \times \mathbf{B} & \mathbf{M} &= \mathbf{p}_m \times \mathbf{M} & \mathbf{p}_m &= NIS \\
 U_i &= -\frac{d\Phi_m}{dt} & \Phi_m &= NS \cdot \mathbf{B} & I_{ef} &= \frac{I_0}{\sqrt{2}} & U_{ef} &= \frac{U_0}{\sqrt{2}} & \vec{P} &= I_{ef} U_{ef} & \omega &= \frac{1}{\sqrt{LC}} & L &= \frac{\mu_0 N^2 S}{l} \\
 k_1 \sin \alpha &= k_2 \sin \beta & \frac{1}{a} + \frac{1}{b} &= \frac{1}{f} & \frac{h_1}{h_2} &= \frac{a}{b}
 \end{aligned}$$