FIZIKA

DRŽAVNA MATURA
šk. god. 2024./2025.

KNJIŽICA FORMULA

Fizika

POPIS FORMULA I KONSTANTI

Kinematika

$$\bar{v} = \frac{\Delta s}{\Delta t}$$

$$\bar{a} = \frac{\Delta v}{\Delta t}$$

$$s = v_0 t + \frac{1}{2} a t^2$$

$$v = v_0 + at$$

$$v^2 = v_0^2 + 2as$$

$$a_{cp} = \frac{v^2}{r}$$

$$f = \frac{1}{T}$$

Dinamika

$$a = \frac{F}{m}$$

$$F_{tr} = \mu F_P$$

$$F_{elas} = kx$$

$$p = mv$$

$$F\Delta t = \Delta p$$

$$W = \Delta E$$

$$W = Fs \cos\alpha$$

$$E_k = \frac{mv^2}{2}$$

$$\Delta E_{gp} = mg\Delta h$$

$$E_{ep} = \frac{1}{2} kx^2$$

$$P = \frac{W}{t}$$

$$F_G = G\frac{m_1 m_2}{r^2}$$

Hidromehanika

$$p = \frac{F}{S}$$

$$p = \rho g h$$

$$F_u = \rho g V$$

$$S_1 v_1 = S_2 v_2$$

$$p_1 + \frac{\rho v_1^2}{2} = p_2 + \frac{\rho v_2^2}{2}$$

$$\rho = \frac{m}{V}$$

Termodinamika

$$n = \frac{N}{N_A} = \frac{m}{M}$$

$$\overline{E_k} = \frac{3}{2} k_B T$$

$$U = \frac{3}{2} N k_B T$$

$$pV = nRT$$

$$\ell = \ell_0 (1 + \alpha \Delta t)$$

$$Q = mc\Delta t$$

$$Q_t = m\lambda$$

$$Q_i = mr$$

$$Q = W + \Delta U$$

$$W = p\Delta V$$

$$\eta = 1 - \frac{T_2}{T_1}$$

Elektricitet i magnetizam

$$F = \frac{k}{\varepsilon_r} \frac{q_1 q_2}{r^2}$$

$$E = \frac{F}{q}$$

$$E = \frac{k}{\varepsilon_r} \frac{q}{r^2}$$

$$W = qU$$

$$E = \frac{U}{d}$$

$$\varphi = \frac{k}{\varepsilon_r} \frac{q}{r}$$

$$C = \frac{q}{U}$$

$$C = \varepsilon_0 \varepsilon_r \frac{S}{d}$$

$$W = \frac{CU^2}{2}$$

$$I = \frac{\Delta q}{\Delta t}$$

$$I = \frac{U}{R}$$

$$R = \rho \frac{\ell}{S}$$

$$I = \frac{\varepsilon}{R_u + R_v}$$

$$P = UI$$

$$B = \mu_0 \mu_r \frac{I}{2r\pi}$$

$$B = \mu_0 \mu_r \frac{NI}{\ell}$$

$$F = BI\ell \sin \alpha$$

$$F_L = qvB \sin \alpha$$

$$\Phi = BS \cos \alpha$$

$$U_i = -N \frac{\Delta \Phi}{\Delta t}$$

$$U_i = -B\ell v \sin \alpha$$

$$I = \frac{U}{Z}$$

$$R_L = L\omega$$

$$R_C = \frac{1}{C\omega}$$

$$Z = \sqrt{R^2 + (R_L - R_C)^2}$$

$$\frac{N_1}{N_2} = \frac{U_1}{U_2} = \frac{I_2}{I_1}$$

Fizika

Titranje i valovi

$$T = 2\pi\sqrt{\frac{m}{k}} \qquad\qquad T = 2\pi\sqrt{\frac{\ell}{g}} \qquad\qquad T = 2\pi\sqrt{LC} \qquad\qquad \omega = \frac{2\pi}{T}$$

$$y = A\sin(\omega t + \varphi_0) \qquad v = v_0\cos(\omega t + \varphi_0) \qquad v_0 = \frac{2\pi A}{T} \qquad v = \frac{\lambda}{T}$$

$$a = -a_0\sin(\omega t + \varphi_0) \qquad a_0 = \frac{4\pi^2 A}{T^2} \qquad y = A\sin\left(\omega t - \frac{2\pi x}{\lambda}\right) \qquad L = 10\log\frac{I}{I_0}$$

$$f_p = f_i\frac{v + v_p}{v - v_i} \qquad\qquad I = \frac{P}{S}$$

Optika

$$n = \frac{c}{v} \qquad\qquad \frac{\sin\alpha}{\sin\beta} = \frac{n_2}{n_1} \qquad\qquad \frac{1}{a} + \frac{1}{b} = \frac{1}{f} \qquad\qquad \frac{y'}{y} = -\frac{b}{a}$$

$$j = \frac{1}{f} \qquad\qquad \lambda = \frac{sd}{a} \qquad\qquad d\sin\alpha_k = k\lambda \qquad\qquad \mathrm{tg}\,\alpha_B = n$$

Moderna fizika

$$L = L_0\sqrt{1 - \frac{v^2}{c^2}} \qquad T = \frac{T_0}{\sqrt{1 - \frac{v^2}{c^2}}} \qquad E = \frac{mc^2}{\sqrt{1 - \frac{v^2}{c^2}}} \qquad E_f = hf$$

$$E_f = W_i + E_k \qquad\qquad \lambda = \frac{h}{p} \qquad\qquad E_f = E_n - E_m = -13,6\,\mathrm{eV}\left(\frac{1}{n^2} - \frac{1}{m^2}\right); \ n > m$$

$$E = \Delta mc^2 \qquad\qquad N = N_0 2^{-\frac{t}{T}} = N_0 e^{-\lambda t} \qquad\qquad \lambda = \frac{\ln 2}{T} \qquad\qquad A = \lambda N$$

Konstante

gravitacijska konstanta	$G = 6{,}67 \cdot 10^{-11}\ \mathrm{N\,kg^{-2}\,m^2}$
ubrzanje slobodnoga pada pri površini Zemlje	$g = 9{,}81\ \mathrm{m\,s^{-2}}$ (u zadatcima uzeti $10\ \mathrm{m\,s^{-2}}$)
masa Zemlje	$M = 6 \cdot 10^{24}\ \mathrm{kg}$
polumjer Zemlje	$R = 6370\ \mathrm{km}$
normirani atmosferski tlak	$p_\mathrm{a} = 101325\ \mathrm{Pa}$
unificirana atomska masa	$u = 1{,}66 \cdot 10^{-27}\ \mathrm{kg}$
Avogadrova konstanta	$N_\mathrm{A} = 6{,}022 \cdot 10^{23}\ \mathrm{mol^{-1}}$
opća plinska konstanta	$R = 8{,}314\ \mathrm{J\,K^{-1}\,mol^{-1}}$
brzina svjetlosti u vakuumu	$c = 3 \cdot 10^{8}\ \mathrm{m\,s^{-1}}$
elementarni naboj	$e = 1{,}6 \cdot 10^{-19}\ \mathrm{C}$
masa elektrona	$m_\mathrm{e} = 9{,}11 \cdot 10^{-31}\ \mathrm{kg}$
masa protona	$m_\mathrm{p} = 1{,}67 \cdot 10^{-27}\ \mathrm{kg}$
Coulombova konstanta	$k = 9 \cdot 10^{9}\ \mathrm{N\,m^2\,C^{-2}}$
permitivnost vakuuma	$\varepsilon_0 = 8{,}85 \cdot 10^{-12}\ \mathrm{F\,m^{-1}}$
permeabilnost vakuuma	$\mu_0 = 4\pi \cdot 10^{-7}\ \mathrm{T\,m\,A^{-1}}$
prag čujnosti	$I_0 = 10^{-12}\ \mathrm{W\,m^{-2}}$
Boltzmannova konstanta	$k_\mathrm{B} = 1{,}38 \cdot 10^{-23}\ \mathrm{J\,K^{-1}}$
Planckova konstanta	$h = 6{,}626 \cdot 10^{-34}\ \mathrm{J\,s}$

Periodni sustav elemenata IUPAC

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1 **H** 1,01																	2 **He** 4,00
3 **Li** 6,94	4 **Be** 9,01											5 **B** 10,8	6 **C** 12,0	7 **N** 14,0	8 **O** 16,0	9 **F** 19,0	10 **Ne** 20,2
11 **Na** 23,0	12 **Mg** 24,3											13 **Al** 27,0	14 **Si** 28,1	15 **P** 31,0	16 **S** 32,1	17 **Cl** 35,5	18 **Ar** 39,9
19 **K** 39,1	20 **Ca** 40,1	21 **Sc** 45,0	22 **Ti** 47,9	23 **V** 50,9	24 **Cr** 52,0	25 **Mn** 54,9	26 **Fe** 55,8	27 **Co** 58,9	28 **Ni** 58,7	29 **Cu** 63,5	30 **Zn** 65,4	31 **Ga** 69,7	32 **Ge** 72,6	33 **As** 74,9	34 **Se** 79,0	35 **Br** 79,9	36 **Kr** 83,8
37 **Rb** 85,5	38 **Sr** 87,6	39 **Y** 88,9	40 **Zr** 91,2	41 **Nb** 92,9	42 **Mo** 95,9	43 **Tc** [98]	44 **Ru** 101	45 **Rh** 103	46 **Pd** 106	47 **Ag** 108	48 **Cd** 112	49 **In** 115	50 **Sn** 119	51 **Sb** 122	52 **Te** 128	53 **I** 127	54 **Xe** 131
55 **Cs** 133	56 **Ba** 137	57-71 lantanoidi	72 **Hf** 178	73 **Ta** 181	74 **W** 184	75 **Re** 186	76 **Os** 190	77 **Ir** 192	78 **Pt** 195	79 **Au** 197	80 **Hg** 201	81 **Tl** 204	82 **Pb** 207	83 **Bi** 209	84 **Po** [209]	85 **At** [210]	86 **Rn** [222]
87 **Fr** [223]	88 **Ra** [226]	89-103 aktinoidi	104 **Rf** [261]	105 **Db** [262]	106 **Sg** [266]	107 **Bh** [264]	108 **Hs** [277]	109 **Mt** [268]	110 **Ds** [269]	111 **Rg** [272]	112 **Cn** [285]						

57 **La** 139	58 **Ce** 140	59 **Pr** 141	60 **Nd** 144	61 **Pm** [145]	62 **Sm** 150	63 **Eu** 152	64 **Gd** 157	65 **Tb** 159	66 **Dy** 163	67 **Ho** 165	68 **Er** 167	69 **Tm** 169	70 **Yb** 173	71 **Lu** 175
89 **Ac** [227]	90 **Th** 232	91 **Pa** 231	92 **U** 238	93 **Np** [237]	94 **Pu** [244]	95 **Am** [243]	96 **Cm** [247]	97 **Bk** [247]	98 **Cf** [251]	99 **Es** [252]	100 **Fm** [257]	101 **Md** [258]	102 **No** [259]	103 **Lr** [262]

Prazna stranica

Fizika