



Nacionalni centar  
za vanjsko vrednovanje  
obrazovanja

Identifikacijska  
naljepnica

PAŽLJIVO NALIJEPI

# FIZIKA

DRŽAVNA MATURA

šk. god. 2022./2023.

KNJIŽICA FORMULA

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FIZ.54.HR.R.T1.08



53261

## POPIS FORMULA I KONSTANTI

### Kinematika

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

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

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

$$v = v_0 + at$$

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

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

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

### Dinamika

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

$$F_{\text{tr}} = \mu F_{\text{p}}$$

$$F_{\text{elas}} = kx$$

$$p = mv$$

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

$$W = \Delta E$$

$$W = Fs \cos \alpha$$

$$E_{\text{k}} = \frac{mv^2}{2}$$

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

$$E_{\text{cp}} = \frac{1}{2} kx^2$$

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

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

### Hidromehanika

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

$$p = \rho gh$$

$$F_{\text{u}} = \rho g V$$

$$S_1 v_1 = S_2 v_2$$

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

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

## Termodinamika

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

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

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

$$pV = nRT$$

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

$$Q = mc \Delta t$$

$$Q_t = m \lambda$$

$$Q_i = m r$$

$$Q = W + \Delta U$$

$$W = p \Delta V$$

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

## Elektricitet i magnetizam

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

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

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

$$W = qU$$

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

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

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

$$C = \epsilon_0 \epsilon_r \frac{S}{d}$$

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

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

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

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

$$I = \frac{\mathcal{E}}{R_u + R_v}$$

$$P = UI$$

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

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

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

$$F_L = qvB \sin \alpha$$

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

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

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

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

$$R_L = L \omega$$

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

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

## Titranje i valovi

$$T = 2\pi\sqrt{\frac{m}{k}}$$

$$T = 2\pi\sqrt{\frac{\ell}{g}}$$

$$T = 2\pi\sqrt{LC}$$

$$\omega = \frac{2\pi}{T}$$

$$y = A \sin(\omega t + \varphi_0)$$

$$v = v_0 \cos(\omega t + \varphi_0)$$

$$v_0 = \frac{2\pi A}{T}$$

$$v = \frac{\lambda}{T}$$

$$a = -a_0 \sin(\omega t + \varphi_0)$$

$$a_0 = \frac{4\pi^2 A}{T^2}$$

$$y = A \sin\left(\omega t - \frac{2\pi x}{\lambda}\right)$$

$$L = 10 \log \frac{I}{I_0}$$

$$f_p = f_i \frac{v + v_p}{v - v_i}$$

$$I = \frac{P}{S}$$

## Optika

$$n = \frac{c}{v}$$

$$\frac{\sin \alpha}{\sin \beta} = \frac{n_2}{n_1}$$

$$\frac{1}{a} + \frac{1}{b} = \frac{1}{f}$$

$$\frac{y'}{y} = -\frac{b}{a}$$

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

$$\lambda = \frac{sd}{a}$$

$$d \sin \alpha_k = k\lambda$$

$$\operatorname{tg} \alpha_B = n$$

## Moderna fizika

$$L = L_0 \sqrt{1 - \frac{v^2}{c^2}}$$

$$T = \frac{T_0}{\sqrt{1 - \frac{v^2}{c^2}}}$$

$$E = \frac{mc^2}{\sqrt{1 - \frac{v^2}{c^2}}}$$

$$E_f = hf$$

$$E_f = W_i + E_k$$

$$\lambda = \frac{h}{p}$$

$$E_f = E_n - E_m = -13,6 \text{ eV} \left( \frac{1}{n^2} - \frac{1}{m^2} \right); \quad n > m$$

$$E = \Delta mc^2$$

$$N = N_0 2^{-\frac{t}{T}} = N_0 e^{-\lambda t}$$

$$\lambda = \frac{\ln 2}{T}$$

$$A = \lambda N$$

**Konstante**

gravitacijska konstanta	$G = 6,67 \cdot 10^{-11} \text{ Nkg}^{-2}\text{m}^2$
ubrzanje slobodnoga pada pri površini Zemlje	$g = 9,81 \text{ ms}^{-2}$ (u zadacima uzeti $10 \text{ ms}^{-2}$ )
masa Zemlje	$M = 6 \cdot 10^{24} \text{ kg}$
polumjer Zemlje	$R = 6370 \text{ km}$
normirani atmosferski tlak	$p_a = 101325 \text{ Pa}$
unificirana atomska masa	$u = 1,66 \cdot 10^{-27} \text{ kg}$
Avogadrova konstanta	$N_A = 6,022 \cdot 10^{23} \text{ mol}^{-1}$
opća plinska konstanta	$R = 8,314 \text{ JK}^{-1}\text{mol}^{-1}$
brzina svjetlosti u vakuumu	$c = 3 \cdot 10^8 \text{ ms}^{-1}$
elementarni naboj	$e = 1,6 \cdot 10^{-19} \text{ C}$
masa elektrona	$m_e = 9,11 \cdot 10^{-31} \text{ kg}$
masa protona	$m_p = 1,67 \cdot 10^{-27} \text{ kg}$
Coulombova konstanta	$k = 9 \cdot 10^9 \text{ Nm}^2\text{C}^{-2}$
permitivnost vakuumu	$\epsilon_0 = 8,85 \cdot 10^{-12} \text{ Fm}^{-1}$
permeabilnost vakuumu	$\mu_0 = 4\pi \cdot 10^{-7} \text{ TmA}^{-1}$
prag čujnosti	$I_0 = 10^{-12} \text{ Wm}^{-2}$
Boltzmannova konstanta	$k_B = 1,38 \cdot 10^{-23} \text{ JK}^{-1}$
Planckova konstanta	$h = 6,626 \cdot 10^{-34} \text{ Js}$

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																
11 Na 23,0	12 Mg 24,3																
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 lantanoïdi	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 aktinoïdi	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

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