

$$\begin{aligned}
 N_A &= 6,022 \cdot 10^{23} \text{ 1/mol} \\
 G &= 6,674 \cdot 10^{-11} \text{ Nm}^2/\text{kg}^2 \\
 e &= -1,602 \cdot 10^{-19} \text{ C} \\
 F &= 96,5 \cdot 10^3 \text{ C/mol} \\
 V_m &= 22,41 \text{ l/mol (NTP)} \\
 1 \text{ atm} &= 101\,325 \text{ Pa} \\
 g &= 9,81 \text{ m/s}^2 \\
 0^\circ\text{C} &= 273,15 \text{ K} \\
 h &= 6,626 \cdot 10^{-34} \text{ Js} = 4,1357 \cdot 10^{-15} \text{ eVs} \\
 \sigma &= 5,670 \cdot 10^{-8} \text{ W}/(\text{m}^2 \cdot \text{K}^4) \\
 \epsilon_0 &= 8,85 \cdot 10^{-12} \text{ F/m} \\
 c &= 3,00 \cdot 10^8 \text{ m/s} \\
 c_a &= 343 \text{ m/s} \\
 \rho(\text{H}_2\text{O}) &= 1,00 \cdot 10^3 \text{ kg/m}^3 \text{ (} 0^\circ\text{C} - 100^\circ\text{C)} \\
 c_{\text{H}_2\text{O}} &= 4,19 \text{ kJ}/(\text{kg} \cdot \text{K}) \\
 K_w &= 1,008 \cdot 10^{-14} \text{ (mol/l)}^2 \\
 R &= 8,314 \text{ J}/(\text{mol} \cdot \text{K}) \\
 1 \text{ eV} &= 1,602 \cdot 10^{-19} \text{ J} \\
 1 \text{ kWh} &= 3,6 \text{ MJ} \\
 e &= 2,718\,28 \\
 \text{protoni/proton:} & \quad m_p = 1,672\,621\,6 \cdot 10^{-27} \text{ kg} \\
 \text{neutroni/neutron:} & \quad m_n = 1,674\,927\,3 \cdot 10^{-27} \text{ kg} \\
 \text{elektroni/elektron:} & \quad m_e = 9,109\,382\,2 \cdot 10^{-31} \text{ kg} \\
 & \quad u = 1,660\,538\,9 \cdot 10^{-27} \text{ kg} \\
 & \quad m_p = 1,007\,276\,5 \text{ u} \\
 & \quad m_n = 1,008\,665\,0 \text{ u} \\
 & \quad m_e = 5,485\,799\,1 \cdot 10^{-4} \text{ u}
 \end{aligned}$$

$$p = \rho gh$$

$$A = 4\pi r^2; \quad V = \frac{4}{3}\pi r^3$$

$$ax^2 + bx + c = 0; \quad x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$W = Fs$$

$$E_p = mgh$$

$$E_k = \frac{1}{2}mv^2$$

$$s = v_0t + \frac{1}{2}at^2$$

$$v = v_0 + at$$

$$T = \frac{2\pi}{\omega}; \quad f_n = \frac{n}{t} = \frac{1}{T}$$

$$a = v^2/r$$

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

$$E_p = -\frac{Gm_1 m_2}{r}$$

$$F = \frac{mv^2}{r} = m\omega^2 r = \frac{4\pi^2}{T^2} mr$$

$$y(x, t) = y_{\max} \sin(\omega t - kx)$$

$$p(x, t) = p_{\max} \cos(\omega t - kx)$$

$$\vec{M} = \vec{r} \times \vec{F}$$

$$\vec{p} = m\vec{v}$$

$$P = W/t$$

$$\eta = \frac{W_0}{W_i} = \frac{W_0/t}{W_i/t} = \frac{P_0}{P_i}$$

$$\frac{\sin(\alpha_1)}{\sin(\alpha_2)} = \frac{\lambda_1}{\lambda_2} = \frac{c_1}{c_2} = \frac{n_2}{n_1} = n_{12}$$

$$F = -kx; \quad \frac{F}{A} = E \frac{\Delta \ell}{\ell}$$

$$p = \frac{F}{A} = \frac{Fs}{As} = \frac{W}{V}$$

$$L = 10 \lg \left(\frac{I}{I_0} \right) \text{ dB}$$

$$f = f_0 \frac{v}{v \pm v_l}$$

$$f = f_0 \frac{v \pm v_h}{v}$$

$$pV = nRT$$

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

$$V = V_0(1 + \gamma \Delta T)$$

$$Q = c_p m \Delta T$$

$$Q = sm$$

$$Q = rm$$

$$U = RI; \quad P = UI$$

$$f = \frac{1}{2\pi\sqrt{LC}}$$

$$M = NABI \sin(\alpha)$$

$$e = NAB\omega \sin(\omega t)$$

$$F = QE; \quad E = U/d$$

$$\vec{F} = q(\vec{v} \times \vec{B}); \quad F = qvB \sin(\alpha)$$

$$F = \frac{Q_1 Q_2}{4\pi\epsilon_0 r^2}$$

$$W = qU$$

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

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

$$E = hf = \frac{hc}{\lambda}; \quad E(\text{eV}) = 1240/\lambda(\text{nm})$$

$$T_{1/2} = \frac{\ln(2)}{\lambda}; \quad \ln(2) = 0,693$$

$$A = \lambda N = \lambda N_0 e^{-\lambda t} = A_0 e^{-\lambda t}$$

$$A = A_1 e^{-\lambda_1 t} + A_2 e^{-\lambda_2 t}$$

$$I = I_0 e^{-\mu x}$$

$$E_B = [Zm_p + Nm_n - m_A + Zm_e]c^2$$

$$I = \frac{\Phi}{\omega} = \frac{\Phi_{\text{tot}}}{4\pi}; \quad E = \frac{\Phi}{A}$$

$$K_a = \frac{[A^-][H_3O^+]}{[HA]}$$

$$pH = pK_a + \lg \frac{[A^-]}{[HA]}$$

$$\Delta V = -\frac{RT}{ZF} \ln \frac{c^s}{c^u}$$

$$J = -D \left(\frac{dc}{dx} + Zc \frac{F}{RT} \frac{dV}{dx} \right)$$

$$\frac{c_K^s}{c_K^u} = \frac{c_{Cl}^u}{c_{Cl}^s}$$

$$(c_{Cl}^u + |Z_p|c_p^u)c_{Cl}^0 = c_K^s c_{Cl}^s$$

$$I = C \frac{dE}{dt} + g_{Na}(E - E_{Na}) + g_K(E - E_K) + g_\ell(E - E_\ell)$$

$$R = \frac{\Delta p}{q_v} = \frac{8\eta L}{\pi r^4}; \quad Re = \frac{\rho v R}{\eta}$$

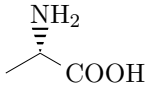
$$v' = \frac{2(\rho - \rho_0)gr^2}{9\eta}$$

$$PRU = \frac{\Delta p \text{ (mmHg)}}{q_v \text{ (ml/s)}}$$

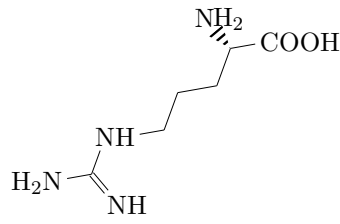
$$PVR = \frac{80(PA_m - LA_m)}{V_p}$$

$$SVR = \frac{80(AO_m - RA_m)}{V_p}$$

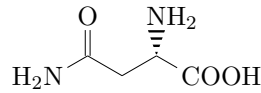
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
I	II	IIIb	IVb	Vb	VIb	VIIb	VIIIb			lb	IIb	III	IV	V	VI	VII	VIII
H [1] 1,0079																	He [2] 4,0026
Li [3] 6,9412	Be [4] 9,0121											B [5] 10,811	C [6] 12,010	N [7] 14,006	O [8] 15,999	F [9] 18,998	Ne [10] 20,179
Na [11] 22,989	Mg [12] 24,305											Al [13] 26,981	Si [14] 28,085	P [15] 30,973	S [16] 32,065	Cl [17] 35,453	Ar [18] 39,948
K [19] 39,098	Ca [20] 40,078	Sc [21] 44,955	Ti [22] 47,867	V [23] 50,941	Cr [24] 51,966	Mn [25] 54,938	Fe [26] 55,845	Co [27] 58,933	Ni [28] 58,693	Cu [29] 63,546	Zn [30] 65,409	Ga [31] 69,723	Ge [32] 72,641	As [33] 74,921	Se [34] 78,963	Br [35] 79,904	Kr [36] 83,798
Rb [37] 85,467	Sr [38] 87,621	Y [39] 88,905	Zr [40] 91,224	Nb [41] 92,906	Mo [42] 95,942	Tc [43] 98,906	Ru [44] 101,07	Rh [45] 102,90	Pd [46] 106,42	Ag [47] 107,86	Cd [48] 112,41	In [49] 114,81	Sn [50] 118,71	Sb [51] 121,76	Te [52] 127,60	I [53] 126,90	Xe [54] 131,29
Cs [55] 132,90	Ba [56] 137,32	La [57] 138,90	Hf [72] 178,49	Ta [73] 180,94	W [74] 183,84	Re [75] 186,20	Os [76] 190,23	Ir [77] 192,21	Pt [78] 195,08	Au [79] 196,96	Hg [80] 200,59	Tl [81] 204,38	Pb [82] 207,21	Bi [83] 208,98	Po [84] 208,98	At [85] 209,98	Rn [86] 222,01
Fr [87] 223,01	Ra [88] 226,02	Ac [89] 227,02	Rf [104] 261,10	Db [105] 262,11	Sg [106] 266,12	Bh [107] 264,12	Hs [108]	Mt [109]	Ds [110]	Rg [111]	Cn [112]	Nh [113]	Fl [114]	Mc [115]	Lv [116]	Ts [117]	Og [118]
Lantanoidit / Lantanoider				Ce [58] 140,11	Pr [59] 140,90	Nd [60] 144,24	Pm [61] 146,91	Sm [62] 150,36	Eu [63] 151,96	Gd [64] 157,25	Tb [65] 158,92	Dy [66] 162,50	Ho [67] 164,93	Er [68] 167,25	Tm [69] 168,93	Yb [70] 173,04	Lu [71] 174,96
Aktinoidit / Aktinoider				Th [90] 232,03	Pa [91] 231,03	U [92] 238,02	Np [93] 237,04	Pu [94] 244,06	Am [95] 243,06	Cm [96] 247,07	Bk [97] 247,07	Cf [98] 251,07	Es [99] 252,08	Fm [100] 257,09	Md [101] 258,09	No [102] 259,10	Lr [103] 260,10



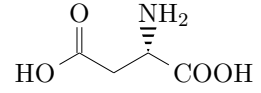
**Alaniini/
Alanin**
Ala, A



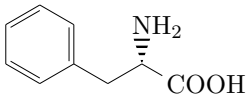
**Argiiniini/
Arginin**
Arg, R



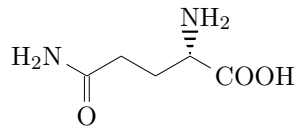
**Asparagiini/
Asparagin**
Asn, N



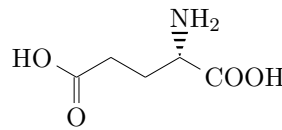
**Asparagiinihappo/
Asparaginsyra**
Asp, D



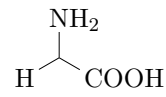
**Fenyylialaniini/
Fenylalanin**
Phe, F



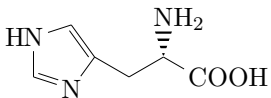
**Glutamiini/
Glutamin**
Gln, Q



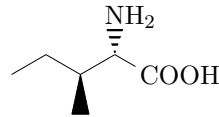
**Glutamiinihappo/
Glutaminsyra**
Glu, E



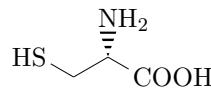
**Glysiini/
Glycin**
Gly, G



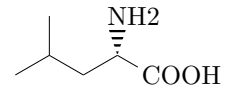
**Histidiini/
Histidin**
His, H



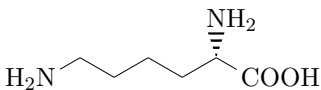
**Isoleusiini/
Isoleucin**
Ile, I



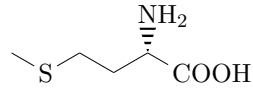
**Kysteiini/
Cystein**
Cys, C



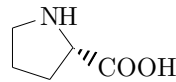
**Leusiini/
Leucin**
Leu, L



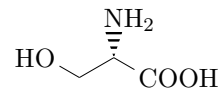
**Lysiini/
Lysin**
Lys, K



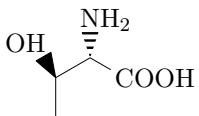
**Metioniini/
Metionin**
Met, M



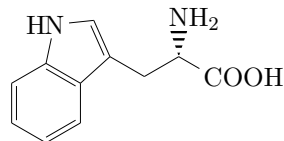
**Proliini/
Prolin**
Pro, P



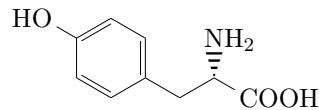
**Seriini/
Serin**
Ser, S



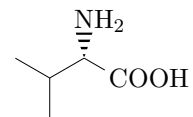
**Treoniini/
Treonin**
Thr, T



**Tryptofaani/
Tryptofan**
Trp, W



**Tyrosiini/
Tyrosin**
Tyr, Y



**Valiini/
Valin**
Val, V