Formula overview

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With the base formula the following fundamental constants and significant physical parameters were derived.

<u>Variable used:</u>

c = Speed of light
h = Planck constant
$\hbar$ = reduced Planck constant
l_P = Planck length
t_P = Planck time
m_P = Planck mass
V_P = Planck volume
m_{PeV} = Planck mass in eV
$\lambda_{C(Planck)}$ = Compton wavelength of Planck mass
E_P = Planck energy

G = Gravitational constant
α = Fine structure constant
g = Acceleration due to gravity
Q_P = Planck charge
R_K = Von-Klitzing constant
u = Atomic mass unit
N_A = Avogadro constant
R_m = universal gas constant
k_B = Boltzmann constant

<u>Electron</u>

e = Elementary charge
m_e = Electron mass
r_K = Classical electron radius
O_{rk} = Surface of classical electron radius
V_e = Volume of classical electron radius
μ_e = Magnetic moment of electron
$\lambda_{C(Elektron)}$ = Compton wavelength of electron
C_e = Coulomb force of electron
$g_{FaktorElektron}$ = Electron spin g-factor
e_{gyro} = gyromagnetic ratio of electron
$m_{e(eV)}$ = electron mass in eV

<u>Proton</u>

m_{Prot} = proton mass
r_{Prot} = proton's radius
V_{Prot} = volume of proton
O_{Prot} = surface of proton
$m_{\mathrm{Prot}(eV)}$ = proton mass in eV
μ_{Prot} = magnetic moment of proton
$\lambda_{C(\mathrm{Prot})}$ = Compton wavelength of proton
C_{Prot} = Coulomb force of proton
$g_{Faktor\,\mathrm{Proton}}$ = proton spin g-factor

<u>Neutron</u>

m_N = neutron mass
r_N = neutron's radius
V_N = volume of neutron
O_N = surface of neutron
$m_{N(eV)}$ = neutron mass in eV
μ_N = magnetic moment of neutron
$\lambda_{C(Neutron)}$ = Compton wavelength neutron
C_N = Coulomb force of neutron
$g_{FaktorNeutron}$ = neutron spin g-factor

Important note:

No original Planck units and their numerical values were used in this book and in this formula overview. However, in honor of Max Planck, I have named after him the new quantized sizes. The Planck mass, the Planck length, etc. should therefore not to be confused with the original Planck units.

The following equations are derived to make certain connections clear. Here, the Planck length wasn't used in order to ensure clarity. The multiplication by the number one in the Planck length has no effect on the numerical values. During the comparison of equations derived with CODATA values, however, the Planck length is included in the extension with the orders of ten.

The base formula as elementary constant

With $\hbar = 1{,}05482228647939 \cdot 10^{-34}$, c= 299.792.458 and $l_P = 10^{-26}$

CODATA-value of reduced Planck constant: $\hbar = 1{,}054571726 \cdot 10^{-34}$ Js
The deviation from the CODATA value: $0{,}00025056114310492 \cdot 10^{-34}$

CODATA-Value $\hbar \cdot c$ in eV: $\hbar \cdot c = 197{,}3269718$ MeVfm
With the base formula in eV: $\hbar \cdot c = 197{,}392088021787$ MeVfm

1.	$\hbar \cdot c = \sqrt{10} \cdot 10^{-26}$	2.	$\hbar = \frac{\sqrt{10}}{c} \cdot 10^{-26}$

Planck charge

$Q_p = 3{,}20405715533983 \cdot 10^{-19}\, Coulomb$

3.	$Q_P = 2e$ => $e = \frac{Q_P}{2}$	4.	$Q_p = \frac{\sqrt{10}}{\pi^2}$
5.	$Q_P = \frac{\hbar \cdot c}{\pi^2}$	6.	$Q_P = \frac{m_P \cdot c^2}{\pi^2}$

Planck mass

$m_p = 3{,}51850841584345 \cdot 10^{-17} \, kg$

$m_{PeV} = 197{,}3920880217870$ MeV

7.	$m_p = \dfrac{\hbar}{c \cdot l_P}$	8.	$m_P = \dfrac{Q_P \cdot \pi^2}{c^2}$
9.	$m_p = \dfrac{\sqrt{10}}{c^2}$	10.	$m_P = \dfrac{1}{c^2 \cdot \sqrt{10}}$
11.	$m_P = \dfrac{\hbar^2}{\sqrt{10}}$	12.	$m_{P(eV)} = 2 \cdot \pi^2$
13.	$m_{p(eV)} = \dfrac{\hbar \cdot c}{e}$		

Planck energy

$E_P = 3{,}16227766016838 \;\; Joule$

14.	$E_P = \sqrt{10} = e \cdot 2\pi^2$	15.	$E_P = \sqrt{10}$
16.	$E_P = \dfrac{\hbar \cdot c}{l_P}$	17.	$E_P = m_P \cdot c^2 = \sqrt{10}$
18.	$E_P = Q_P \cdot \pi^2$		

Planck time

19.	$t_P = 1{,}00100100100100....$

Planck length

20.	$l_P = 10^{-26}$

Elementary charge

With the CODATA-value: $e = 1{,}602176565 \cdot 10^{-19}$ C .
With the following equations, we obtain the value: $e = 1{,}602028577669910 \cdot 10^{-19} C$.
The deviation from the CODATA value: $0{,}000147987330086531 \cdot 10^{-19} C$.

21.	$e = \sqrt{\frac{Q_P}{m_P} \cdot r_K} \cdot \sqrt{10}$	22.	$e = \sqrt{10} \cdot c^{2\cdot} \cdot \frac{r_K}{5}$
23.	$e^2 = m_e \cdot r_K$	24.	$e = \frac{\sqrt{10}}{2\pi^2}$
25.	$\frac{1}{3} e = 8 \cdot G$ $\quad \frac{2}{3} e = 16 \cdot G$ $\quad \frac{4}{3} e = 32 \cdot G$ $\quad \frac{1}{2} e = 12 \cdot G$ Charges of subatomic particles such as quarks		
26.	$e = \frac{12 \cdot V_P \cdot r_K}{m_P \cdot \pi}$	27.	$e = 24 \cdot G$

Electron mass

With the CODATA-value: $9{,}10938291 \cdot 10^{-31} kg$
With the following equations, we obtain the value: $m_e = 9{,}106293851429520 \cdot 10^{-31} kg$
The deviation from the CODATA value: $0{,}003089058570479190 \cdot 10^{-31}$ kg

28.	$m_e = \frac{Q_P}{m_P}$	29.	$m_e = Q_P \cdot \frac{c}{\hbar}$
30.	$m_e = \left(\frac{c}{\pi}\right)^2$	31.	$\sqrt{m_e} = 2\pi \cdot e \cdot c$
32.	$m_e = \left(\frac{\hbar \cdot m_{eV}}{2\pi \cdot c^2}\right)^2$	33.	$m_{e(eV)} = \frac{2 \cdot c^2}{m_P}$
34.	$m_e = \frac{2e}{m_P}$	35.	$m_e \cdot m_P = Q_P = 2 \cdot e$

Classical electron radius

With the following equations, we obtain the value: $r_K = 2{,}818375516476650 \cdot 10^{-15}\, m$

36.	$r_K = \frac{\hbar \cdot e}{2 \cdot c}$	37.	$\left(\frac{Q_P}{2}\right)^2 = m_e \cdot r_K$
38.	$r_K = \frac{1}{4} Q_P \cdot m_P$	39.	$r_K = \frac{\hbar^2}{4\pi^2}$

Fine structure constant

With the CODATA-value: 0,00729735253594845000 or $\frac{1}{137{,}03599971}$

With the following equations, we obtain the value:

$\alpha = 0{,}007294271493324960$ or $\frac{1}{137{,}0938826331190}$

The deviation from the CODATA value: 0,00000308104262349701

40.	$\alpha = \frac{c^2}{\sqrt{10}} \cdot \left(\frac{\sqrt{10}}{2 \cdot \pi^2}\right)^2$	41.	$\alpha = c^2 \cdot \frac{\sqrt{10}}{4\pi^4}$
42.	$\alpha = \frac{c}{\hbar} \cdot \frac{1}{4\pi^4}$	43.	$\alpha = \frac{1}{m_P} \cdot \frac{1}{4\pi^4}$
44.	$\alpha = \frac{Q_P^2}{4 \cdot m_P}$	45.	$\alpha = \frac{1}{4} Q_P \cdot m_e$
46.	$\alpha = \frac{m_e \cdot e}{2}$	47.	$\alpha = \frac{2 \cdot e}{h^2} = \frac{Q_P}{h^2}$
48.	$\alpha = 12 \cdot m_e \cdot G$		

Gravitational constant

With the CODATA-value: $G = 6{,}67384 \cdot 10^{-11}$

With the following equations, we obtain the value: $G = 6{,}6751190736246400 \cdot 10^{-11}$

The deviation from the CODATA value: $0{,}001279073624637630 \cdot 10^{-11}$

49.	$G = 3\frac{1}{3} \cdot \hbar \cdot c \cdot \frac{1}{4\pi \cdot \mu_0}$	50.	$G = 3\frac{1}{3} \cdot \frac{Q_P}{16}$
51.	$G = \frac{Q_P}{48}$	52.	$G = \frac{e}{24}$

Acceleration due to gravity

With the CODATA-value: $g = 9{,}80665$

With the following equations, we obtain the value: $g = 9{,}8066298275635$

53.	$g = \frac{3{,}33333...}{6{,}06060...} \cdot \frac{m_{prot}}{V_e}$	54.	$g = \frac{3}{6} \cdot \frac{1{,}11111...}{1{,}01010...} \cdot \frac{m_{prot}}{V_e}$
55.	$g = \frac{1}{0{,}181818181...} \cdot \frac{m_{prot}}{V_e}$	56.	$g = 5{,}5 \cdot \frac{m_{prot}}{V_e}$

Proton's radius

According to the experiments with muonic hydrogen at the Paul Scherrer Institute (Germany):
$r_{prot} = 8{,}4184 \cdot 10^{-18} m$
With the following equations, we obtain the value: $r_{prot} = 8{,}415160546424410 \cdot 10^{-18} m$

57.	$\sqrt{10} \cdot r_K \cdot r_{prot} = \frac{3}{4}$	58.	$r_{prot} = \frac{3}{4 \cdot r_K \cdot \sqrt{10}}$
59.	$r_{prot} = \frac{3}{Q_P \cdot m_P \cdot \sqrt{10}}$	60.	$Q_P^2 \cdot 2\pi^3 \cdot r_{prot} = 360 \frac{V_P}{m_P}$
61.	$r_{prot} = 1{,}5 \cdot \frac{c^2}{e}$	62.	$r_{prot} = 1{,}8\pi \cdot \frac{V_P}{m_P}$
63.	$r_{prot} = m_N \cdot 16\pi$	64.	$r_{prot} = \frac{m_{prot}}{h \cdot c}$
65.	$r_{prot} = \frac{c^2}{16 \cdot G}$	66.	$r_{prot} = \frac{1{,}5 \cdot c^2}{e}$
67.	$r_{prot} = \frac{m_e \cdot c^2 \cdot 7{,}5}{\alpha}$	68.	$r_{prot} = V_N \cdot \mu_N \frac{32}{0{,}181818....}$ μ_N = magnetic moment of neutron
69.	$\frac{m_{prot}}{V_{prot}} = \frac{r_K}{r_{prot}} \cdot 2$	70.	$r_{prot} = \frac{m_{prot}}{V_{Prot}} \cdot \frac{r_K \cdot g}{22}$ g = acceleration due to gravity
71.	$r_{prot} = \frac{g \cdot \pi}{V_{Prot}} \cdot 6{,}81818181...$	72.	$r_{Prot}^2 \cdot r_K^2 = \frac{16}{g}$

Volume / surface

73.	$V_e = \frac{4}{3}\pi \cdot r_K^3$ $\quad V_P = \frac{4}{3}\pi \cdot \left(\frac{l_P}{2}\right)^3 = \frac{\pi}{6}$ $\quad V_{prot} = \frac{4}{3}\pi \cdot r_{prot}^3$ $O_e = 4\pi \cdot r_K^2$ $\quad O_P = 4\pi \cdot \left(\frac{l_P}{2}\right)^2 = \pi$ $\quad O_{prot} = 4\pi \cdot r_{prot}^2$

Proton mass

With the CODATA-value: $1{,}672621777 \cdot 10^{-27}\,kg$.
With the following equations, we obtain the value: $m_{prot} = 1{,}672023104385960 \cdot 10^{-27}\,kg$.
The deviation from the CODATA value: $0{,}00004498013555790 \cdot 10^{-27}$ kg

74.	$m_{prot} = c \cdot h \cdot r_{prot}$	75.	$m_{prot} = c \cdot \hbar \cdot 2\pi \cdot r_{prot}$
76.	$m_{prot} = \sqrt{10} \cdot 2\pi \cdot r_{prot}$	77.	$m_{prot} = m_P \cdot c^2 \cdot 2\pi \cdot r_{prot}$
78.	$m_{prot} = Q_P \cdot 2\pi^3 \cdot r_{prot}$	79.	$m_e \cdot m_{prot} \cdot m_P^2 = 360 \cdot V_P$
80.	$m_{\mathrm{Pr}ot} \cdot e \cdot \frac{m_P}{V_P} = 1{,}8$	81.	$m_{\mathrm{Pr}ot} \cdot 1{,}111111... = \frac{V_P}{r_K}$
82.	$m_{\mathrm{Pr}ot} = \frac{36 \cdot V_P}{m_e \cdot m_P^2}$	83.	$m_{\mathrm{Pr}ot} = \frac{1{,}5 \cdot \pi}{r_K}$
84.	$m_{\mathrm{Pr}ot} = \frac{6 \cdot \pi}{m_e \cdot m_P^2}$	85.	$m_{\mathrm{Pr}ot} = 3\pi \cdot m_{\mathrm{Pr}ot(eV)} \cdot c^2$
86.	$m_{\mathrm{Pr}ot} = 1{,}5 \cdot \frac{m_{\mathrm{Pr}ot(eV)}}{r_{prot}}$	87.	$m_{\mathrm{Pr}ot} = 2\pi \frac{V_{\mathrm{Pr}ot}}{m_{\mathrm{Pr}ot(eV)}}$

88.	$m_{Prot(eV)} = \frac{m_P}{4 \cdot V_e}$	89.	$m_{Prot(eV)} = 1\frac{1}{3} \cdot r_K \cdot V_{Prot}$
90.	$m_{Prot} = \frac{3}{4} \cdot \frac{m_{e(eV)}}{\alpha \cdot \pi}$	91.	$m_{prot} = g \cdot \frac{V_e}{5{,}5}$ g = acceleration due to gravity
92.	$m_{prot} = \frac{h \cdot c^3}{16 \cdot G}$	93.	$m_{prot} = 6\pi^3 \cdot c^2$
94.	$m^2_{prot} \cdot G \cdot \frac{m_{prot}}{V_{prot}} = \frac{1}{8}$	95.	$m_{prot} = \frac{r_{Prot}}{24\pi \cdot G}$
96.	$m_{prot} = \frac{18 \cdot V_P}{e \cdot m_P}$	97.	$m_{prot} = \frac{9 \cdot V_P}{r_K}$
98.	$m_{Prot(eV)} = \frac{r_K \cdot g}{176 \cdot m_N} = \frac{r_K \cdot g}{m_N} \cdot \frac{0{,}181818...}{32}$	99.	$m_{prot} = \frac{V_P}{m_P \cdot 9 \cdot 8}$
100.	$\frac{m_P}{V_P} \cdot g \cdot 0{,}18181818... = 48 \cdot V_{Prot}$	101.	$m_{prot} = \frac{r^2_{Prot}}{V_P \cdot c^2} \cdot 1{,}111111....$
102.	$E_{Prot} = m_{Prot} \cdot c^2 = \frac{r^2_{Prot}}{V_P} \cdot 1{,}111111....$	103.	$\frac{m_{prot}}{V_{prot}} = 48\frac{V_e \cdot V_P}{m_P}$
104.	$m_{prot} = \frac{V_P}{m_P} \cdot 4\pi^2 \cdot 9 \cdot \sqrt{10}$	105.	$\frac{\sqrt{10}}{m_e} \cdot \frac{\sqrt{10}}{m_{prot}} \cdot V_P = \frac{m_P^2}{36}$
106.	$G \cdot m_{prot} \cdot m_P = 7{,}5 \cdot V_P$		

Neutron mass

With the CODATA-value: $1{,}674927351 \cdot 10^{-27}\,kg$
With the following equations, we obtain the value: $m_{Neutron} = 1{,}6741429973441700 \cdot 10^{-27}\,kg$
The deviation from the CODATA value: $0{,}00062964748531780900 \cdot 10^{-27}\,kg$

107.	$m_{Neutron} = m_{\Pr ot} \cdot G \cdot 1{,}5$	108.	$m_{N(eV)} = \frac{m_e \cdot O_{\Pr ot}}{2 \cdot 6 \cdot 8 \cdot 8 \cdot O_N}$
109.	$\frac{m_{Neutron}}{m_{prot}} = \frac{Q_P}{32} = \frac{e}{16}$	110.	$m_{Neutron} = \frac{m_{prot} \cdot e}{16}$
111.	$\frac{m_{prot} \cdot e}{m_{Neutron}} = 16$	112.	$m_{Neutron} = \frac{V_P}{8{,}8888... \cdot m_P}$
113.	$m_{Neutron} = \frac{r_{\Pr ot}}{16\pi}$	114.	$m_{Neutron} = \frac{r_{\Pr ot}}{96 \cdot V_P}$
115.	$m_{Neutron} = \frac{\pi}{6 \cdot 8{,}8888... \cdot m_P}$	116.	$m_{Neutron} = \frac{r_{\Pr ot} \cdot m_e \cdot \pi}{16 \cdot c^2}$
117.	$m_{Neutron} = \frac{r_K \cdot V_{\Pr ot}}{5 \cdot r_{\Pr ot}}$	118.	$m_{Neutron} = \frac{G \cdot \pi}{r_K \cdot 4{,}444....}$
119.	$m_{Neutron} = \frac{m_e \cdot V_P}{e \cdot 2 \cdot 8{,}8888....}$	120.	$m_{Neutron} = \frac{c^2}{G} \frac{1}{256\pi}$
121.	$m_{Neutron} = \frac{c \cdot V_P}{\hbar \cdot 8{,}8888....}$	122.	$m_{Neutron} = \frac{V_P}{m_P \cdot \hbar \cdot 8{,}8888....}$
123.	$m_{N(eV)} = \frac{r_K}{32 \cdot V_K}$	124.	$m_{N(eV)} = 6{,}6666... \cdot m_{\Pr ot} \cdot r_{\Pr ot}$

Neutron's radius

CODATA: no value
With the following equations, we obtain the value: $r_N = 1{,}057123637686110 \cdot 10^{-18} m$

125.	$r_N = \sqrt{m_N \cdot G}$	126.	$r_N = \frac{8{,}1818... \cdot m_e}{\alpha \cdot \mu_N}$
127.	$r_N^2 = \frac{e \cdot r_{Prot}}{8 \cdot 8 \cdot 6 \cdot \pi}$	128.	$r_N = \frac{m_e \cdot \pi^2}{8 \cdot 8 \cdot 8 \cdot u}$ u = atomic mass unit

Surface of neutron

129.	$O_N = \frac{c^2}{8 \cdot 8}$	130.	$O_N = \frac{m_e \cdot O_{Prot} \cdot O_{r_K}}{8 \cdot 8 \cdot 9}$

Mass ratios

With the CODATA-value: 1836,152671948660
With the following equations, we obtain the value: 1836,118108711690

131.	$\frac{m_{prot}}{m_e} = \frac{1{,}5 \cdot \pi}{e^2}$	132.	$\frac{m_{prot}}{m_e} \cdot \frac{\alpha}{m_{Neutron}} = 8$ (Oktettregel)
133.	$\frac{m_{Neutron}}{m_{Prot}} = G \cdot 1{,}5$		

Second

The atomic second is defined as the duration of 9192631770 periods of the radiation corresponding to the transition between the two hyperfine levels of the ground state of the ^{133}Cs atom.

134.	$$\frac{1}{Second} = m_e \cdot g_{FaktorNeutron} \cdot 3{,}1222222...$$
135.	$$\frac{1}{Second} = m_e \cdot g_{FaktorNeutron} \cdot 2{,}81 \cdot 1{,}11 \cdot 1{,}00100100100...$$
136.	$$Second = \frac{1}{m_e \cdot g_{FaktorNeutron} \cdot 2{,}81 \cdot 1{,}1111111...} = 9192631770$$

Spin g-Factor

Spin g-Factor of Neutron with the CODATA-value: -3,82608545
With the following equation, we obtain the value: $g_{FaktorNeutron} = 3{,}826085450369120$
The deviation from the CODATA value: 0,0000000003691172

137.	$$g_{FaktorNeutron} = \frac{1}{m_e \cdot 9192631770 \cdot 2{,}81 \cdot 1{,}1111111...}$$

Spin g-Factor of Proton with the CODATA-value: 5,585694713
With the following equations, we obtain the value: $g_{FaktorProton} = 5{,}584695283128080$
The deviation from the CODATA value: 0,0009994298719231

138.	$$g_{FaktorProton} = \frac{1}{4{,}68 \cdot g_{FaktorNeutron}}$$	139.	$$g_{FaktorProton} \cdot g_{FaktorNeutron} = \frac{1}{4{,}68}$$
140.	$$\frac{(g_{FaktorProton} \cdot g_{FaktorNeutron})^2}{h} = 6{,}88888....$$		

Spin g-Factor of Electron with the CODATA-value: $g_{FaktorElektron} = 2{,}00231930436153$
With the following equations, we obtain the value: $2 + 2 \cdot g_{FaktorElektron} = 2{,}0023193043835300$
The deviation from the CODATA value: 0,0000000000219992

141.	$g_{FaktorElektron} = \frac{1{,}48 \cdot c}{g_{FaktorNeutron}}$	142.	$1{,}48 = 1{,}11 * 1\frac{1}{3} = \frac{1{,}11}{7{,}5}$
143.	$g_{FaktorElektron} = \frac{1{,}11 \cdot c}{7{,}5 * g_{FaktorNeutron}}$	144.	$g_{FaktorElektron} = \frac{4 \cdot e_{gyro}}{m_P}$ e_{gyro} = gyromagnetic ratio of electron

Compton wavelength

With the CODATA-value of Proton: $\lambda_{C(\mathrm{Prot})} = 1{,}32140985623 \cdot 10^{-15}$
With the following equations, we obtain the value: $\lambda_{C(\mathrm{Prot})} = 1{,}32219706316403 \cdot 10^{-15}$
The deviation from the CODATA value: $0{,}007872069340326 \cdot 10^{-15}$

145.	$\frac{16}{\lambda_{C(prot)}} = \frac{c^4}{G} = Planckforce$	146.	$\lambda_{C(prot)} = \frac{16 \cdot G}{c^4}$
147.	$\lambda_{C(prot)} = 1{,}5 \cdot \frac{V_P \cdot r_K}{m_N}$		

With the CODATA-value of Neutron: $\lambda_{C(Neutron)} = 1{,}319590906 \cdot 10^{-15}$
With the following equations, we obtain the value: $\lambda_{C(Neutron)} = 1{,}32052282371853 \cdot 10^{-15}$
The deviation from the CODATA value: $0{,}00931917218528954 \cdot 10^{-15}$

148.	$\lambda_{C(Neutron)} = m_P^2 \cdot 1{,}066666....$	149.	$\lambda_{C(Neutron)} = 8 \cdot 8 \cdot 6 \cdot 1{,}11111.... \cdot \frac{r_K}{m_e}$
150.	$\lambda_{C(Neutron)} = \frac{8 \cdot 8 \cdot 8 \cdot r_K \cdot G}{\alpha}$	151.	$\lambda_{C(Neutron)} = \frac{12 \cdot m_P}{m_N \cdot V_P}$

With the CODATA-value of Electron: $\lambda_{C(Elektron)} = 2{,}4263102389 \cdot 10^{-12}$

With the following equation, we obtain the value: $\lambda_{C(Elektron)} = 2{,}427709970960890 \cdot 10^{-12}$

The deviation from the CODATA value: $0{,}001399732060891070 \cdot 10^{-12}$

152.	$\lambda_{C(Elektron)} = 2\pi \cdot \frac{r_K}{\alpha}$	153.	$\lambda_{C(Planck)} = \frac{h}{m_P \cdot c} = 2\pi$ with Planck mass

Magnetic moment

With the CODATA-value of Neutron: $\mu_N = -0{,}96623647 \cdot 10^{-26}$

With the following equations, we obtain the value: $\mu_N = -0{,}966237251887549 \cdot 10^{-26}$

The deviation from the CODATA value: $-0{,}0000781887549 \cdot 10^{-26}$

154.	$\mu_N = \frac{m_e}{1{,}222... \cdot r_N \cdot \alpha}$	155.	$\mu_N = \pi \cdot \frac{m_N}{V_N}$

With the CODATA-value of Proton: $\mu_{Prot} = 1{,}410606743 \cdot 10^{-26}$

With the following equations, we obtain the value: $\mu_{Prot} = 1{,}4106135538495 \cdot 10^{-26}$

The deviation from the CODATA value: $0{,}0000676238495292 \cdot 10^{-26}$

156.	$\mu_{Prot} = \frac{m_e}{6{,}45555....}$	157.	$\mu_{Prot} = \frac{2 \cdot \alpha}{e \cdot 6{,}45555....}$

With the CODATA-value of Electron: $\mu_e = -928{,}47643 \cdot 10^{-26}$

With the following equation, we obtain the value: $\mu_e = -928{,}492610427093 \cdot 10^{-26}$

The deviation from the CODATA value: $0{,}016180427092 \cdot 10^{-26}$

158.	$\mu_e = 7{,}5 \cdot m_P^2$

Coulomb force

159.	$C_e = \frac{1}{4\pi \cdot \varepsilon_0} \cdot \frac{e^2}{r_K}$	160.	$C_e = m_e \cdot c^2$

161.	$C_{\Pr ot} = \frac{1}{4\pi \cdot \varepsilon_0} \cdot \frac{e^2}{r_{\Pr ot}}$	162.	$\frac{m_{\Pr ot}}{V_{\Pr ot}} = \frac{2 \cdot C_{\Pr ot}}{C_e}$

163.	$C_N = \frac{1}{4\pi \cdot \varepsilon_0} \cdot \frac{e^2}{r_N}$	164.	$V_N = \frac{m_e^2}{2 \cdot 6 \cdot 8 \cdot 8 \cdot C_N}$

Von-Klitzing constant

Von-Klitzing-Konstante with the CODATA-value: 25.812,8074434
With the following equation, we obtain the value: 25.823,7106890331
The deviation from the CODATA value: 10,903245633129700

165.	$R_K = \frac{h}{e^2} = \frac{\lambda_{C(Elektron)}}{r_K} \cdot c$

Atomic mass unit

With the CODATA-value: $u = 1,660538921 \cdot 10^{-27} kg$
With the following equation, we obtain the value: $u = 1,660525927045410 \cdot 10^{-27} kg$
The deviation from the CODATA value: $0,000012993986783342 \cdot 10^{-27} kg$

166.	$u = r_N \cdot 5\pi$

Avogadro constant

With the CODATA-value: $N_A = 6{,}02214129 \cdot 10^{23} mol^{-1}$
With the following equations, we obtain the value: $N_A = 6{,}02218841460255 \cdot 10^{23} mol^{-1}$
The deviation from the CODATA value: $0{,}000047124602546406 \cdot 10^{23}$

167.	$N_A = \frac{8 \cdot 8 \cdot 8 \cdot m_e \cdot r_K}{C_N}$ with Coulomb force of neutron	168.	$N_A = \frac{1}{u} = \frac{1}{r_N \cdot 5\pi}$

Universal gas constant

With the CODATA-value: $R_m = 8{,}3144621 \frac{J}{molK}$
With the following equations, we obtain the value: $R_m = 8{,}31445842206723 \frac{J}{molK}$
The deviation from the CODATA value: 0,0000037234017185

169.	$R_m = \frac{5{,}55}{G}$	170.	$R_m = \frac{1}{G \cdot 18 \cdot 1{,}00100100...}$

Boltzmann constant

With the CODATA-value: $k_B = 1{,}3806488 \cdot 10^{-23} \frac{J}{K}$
With the following equation, we obtain the value: $k_B = 1{,}380637377918370 \cdot 10^{-23} \frac{J}{K}$
The deviation from the CODATA value: 0,0000114220816319967

171.	$k_B = 8 \cdot 888 \cdot r_N \frac{m_N}{m_e}$

Speed of light

With the following equations, we obtain the value: c=299.792.457,985574
Difference to the literature value: 0,014425933361054

172.	$c = \frac{3}{\left(\frac{10}{9,99}\right)} \cdot 10^8 + \frac{9}{10} \cdot Q_P^2 \cdot 10^6 + \frac{9}{10} \cdot \frac{10}{9,99} \cdot 2 \cdot Q_P \cdot 10^3 \cdot \sum_{n=1}^{26} \frac{1}{10^n}$
173.	$c = \frac{3}{1,00100100...} \cdot 10^8 + 36 \cdot e^2 \cdot 10^{42} + 36 \cdot e \cdot 1,00100100... \cdot 1,111111 \cdot 10^{18}$