# Metric Prefixes

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| symbol | Name | Decimal logarithm | Decimal value | word |
| Y | yotta | 24 | 1 000 000 000 000 000 000 000 000 | septillion |
| Z | zetta | 21 | 1 000 000 000 000 000 000 000 | sextillion |
| E | exa | 18 | 1 000 000 000 000 000 000 | quintillion |
| P | peta | 15 | 1 000 000 000 000 000 | quadrillion |
| T | **tera** | **12** | **1 000 000 000 000** | **trillion** |
| G | **giga** | **9** | **1 000 000 000** | **billion** |
| M | **mega** | **6** | **1 000 000** | **million** |
| k | **kilo** | **3** | **1 000** | **thousand** |
| h | **hecto** | **2** | **100** | **hundred** |
| da | **deca** | **1** | **10** | **ten** |
|  |  | **0** | **1** | **one** |
| d | **deci** | **-1** | **0.1** | **tenth** |
| c | **centi** | **-2** | **0.01** | **hundredth** |
| m | **milli** | **-3** | **0.001** | **thousandth** |
| µ | **micro** | **-6** | **0.000 001** | **millionth** |
| n | **nano** | **-9** | **0.000 000 001** | **billionth** |
| p | **pico** | **-12** | **0.000 000 000 001** | **trillionth** |
| f | femto | -15 | 0.000 000 000 000 001 | quadrillionth |
| a | atto | -18 | 0.000 000 000 000 000 001 | quintillionth |
| z | zepto | -21 | 0.000 000 000 000 000 000 001 | sextillionth |
| y | yocto | -24 | 0.000 000 000 000 000 000 000 001 | septillionth |

# Physical Constants

|  |  |  |  |
| --- | --- | --- | --- |
|  | Name | Value | unit |
| h | Planck constant | 6.62606957(29)×10−34 | J.s-1 |
| NA | Avogadro constant | 6.02214129(27)×1023 | mol−1 |
| R | **Gas constant** | **8.3144621(75)** | **J.mol-1.K-1** |
| e | elementary charge | 1.602176565(35)×10−19 | C |
| g | **Earth gravity acceleration** | **≈ 9.8067** | **m.s-2** |
| gMn | Moon gravity acceleration | ≈ 1.625 | m.s-2 |
| gMrs | Mars gravity acceleration | ≈ 3.728 | m.s-2 |
| me | rest mass of electron | 9.10938215(45)×10−31 | kg |
| mp | rest mass of proton | 1.672621777(74)×10−27 | kg |
| mu | atomic mass unit | 1.660538921(73)×10−27 | kg |
| kB | Boltzmann constant=R/NA | 1.3806488(13)×10−23 | J.K-1 |
| F | Faraday constant = e NA | 9.64853399(24)×104 | C.mol-1 |
| Mu | Molar mass constant = kg/g | 10-3 | kg.g-1 |
| Ɛ0 | Vacuum permittivity | 8.854 187 817… x 10−12 | F.m-1 |
| µ0 | Vacuum permeability | 4π × 10−7 | N.A-2 |
| µB | Bohr magneton | 9.27400968(20)×10−24 | J.T-1 |
| µN | nuclear magneton | 5.05078353(11)×10−27 | J.T-1 |
| VSTP | molar volume of gas at STP | 2.271 0953(21) × 10−2 | m3.mol−1 |
| VNIST | molar volume of gas at NIST | 2.437 3845(64) × 10−2 | m3.mol−1 |
| V37 | molar volume of gas at 37°C | 2.578 7304(20) × 10−2 | m3.mol−1 |

# Selected Chemical Substances

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Substance | | M |  | Substance | | M |
| H­2O | water | 0.018 |  | Ins | insulin | 5.808 |
| H+ | proton | 0.001 |  | Lep | leptin | 16.03 |
| H­3O+ | hydronium | 0.019 |  | Glc | glucagon | 3.485 |
| [H5O2]+ | Zundel cation | 0.037 |  | PRA | renin | 48.000 |
| [H9O4]+ | Eigen cation | 0.073 |  | AGT | angiotensinogen | 56.800 |
| O­2 | oxygen | 0.032 |  | AI | angiotensin I | 1.297 |
| CO­2 | carbon dioxide | 0.044 |  | AII | angiotensin II | 1.046 |
| H2CO3 | carbonic acid | 0.062 |  | Aldo | aldosterone | 0.360 |
| HCO3- | bicarbonate | 0.061 |  | ANP | atriopeptin | 3.060 |
| Na+ | sodium | 0.023 |  | ADH | vasopressin | 1.084 |
| K+ | potassium | 0.039 |  | TSH | thyrotropin | 28.000 |
| ­Cl- | chloride | 0.035 |  | T3-4 | thyroxine | 0.777 |
| H2PO­4-, HPO42- | phosphates | 0.095 |  | EPO | erythropoietin | 34.000 |
| SO­42- | sulfates | 0.096 |  | Epi | epinephrine | 0.183 |
| NH­4+ | amonium | 0.018 |  | NE | norepinephrine | 0.169 |
| Mg2+ | magnesium | 0.024 |  | D3 | calcitriol | 0.417 |
| Ca2+ | calcium | 0.040 |  | PTH | parathormone | 9.400 |
| Fe2+,Fe3+ | iron | 0.056 |  |  | ethanol | 0.046 |
| Glu | glucose | 0.181 |  |  | nicotine | 0.162 |
| FA | fatty acids | 0.255 |  |  | aspirin | 0.180 |
| KA | keto acids | 0.102 |  |  | paracetamol | 0.151 |
| AA | amino acids | 0.100 |  |  | nitredipine | 0.360 |
| Lac- | lactate | 0.090 |  |  | peridopril | 0.368 |
| Triglyc | triglyceride | 0.806 |  |  | metoprolol | 0.267 |
| urea | urea | 0.060 |  |  | desglymidodrine | 0.197 |
| Hb | hemoglobin | 64.500 |  |  | digoxin | 0.781 |
| Alb | albumin | 66.440 |  |  | chlorothiazide | 0.296 |
| Glb | globulins | 34.500 |  |  | furosemide | 0.331 |