Fundamental Constants & Physical Data

1. AVOGADRO'S NUMBER is $N_A = 6.02\ 210 * 10^{23}$

602 Sextillion 213 Quintillion 670 Quadrillion Particles.
Six hundred two sextillion, two hundred thirteen quintillion, six hundred seventy quadrillion particles.

2. BOLTZMANN'S CONSANT is $k = 1.38\ 0\ 658 * 10^{-23}$ J / K

138 Sextillion, 65 Quintillion, 800 Quadrillionths Joule per Kelvin.
One hundred thirty-eight sextillion sixty-five quintillion eight hundred quadrillionths Joule per Kelvin.
One point three eight zero six five eight times ten to the negative twenty-third Joule per Kelvin.

3. The Electron Charge Magnitude is
$e = 1.602\ 177\ 33 * 10^{-19}$ C

16 Quintillion, 21 Quadrillion, 773 Trillion, 330 Billion Quintillionths of a Coulomb of Energy.
Sixteen quintillion, twenty-one quadrillion, seven hundred seventy-three trillion, three hundred thirty billion quintillionths of a Coulomb of Energy.
One point six zero two one seven seven three three times ten to the negative nineteenth power of a Coulomb of Energy.

4. The Permeability of Free Space is $U_0 = 4(pi) * 10^{-7}$ T*m / A

$\Pi \approx 3.14159265$ and $4\pi \approx 12.5663706$

$12.5663706\times10^{-7} = 1.25663706\times10^{-6}$

One point two five six six three seven zero six times ten to the negative sixth power.

Also; $\mu_0 = 4\pi\times10^{-7}$ H/m

H/m measures how strongly space supports magnetic fields.

5. The Permittivity of Free Space is
   $\varepsilon_0 = 8.854\ 187\ 817 * 10^{-12}\ C^2 / (N*m^2)$

6. Plank's Constant is $h = 6.626\ 068\ 91 * 10^{-34}$

7. The Mass of The Electron is
   $m_e = 9.109\ 389\ 7 * 10^{-31}$ kg

8. THe Mass of The Neutron is
   $m_n = 1.674\ 928\ 6 * 10^{27}$ kg

9. The Mass of The Proton is
   $m_p = 1.672\ 623\ 1 * 10^{-27}$ kg

10. The Speed of Light in A Vacuum is
    $c = 2.99\ 792\ 458 * 10^8$ m/s

11. The Universal Gravitational Constant is
    $G = 6.67\ 259 * 10^{-11}\ Nm^2/kg^2$

12. The Universal Gas Constant is
    $R = 8.314\ 510$ J / mol*K

13. The Acceleration due to Earth's Gravity is $g = 9.80\ m/s^2$.

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14. The Acceleration due to Earth's Gravity is g = 32.2 ft/s^2.

15. The Atmospheric Pressure at Sea Level is
    1 atm = 1.01 3 * 10^5 Pa
    101 Thousand 300 Pascals.

16. The Atmospheric Pressure at Sea Level is
    1 atm = 14.70 lb/in^2.

17. The Density of Air at 0*Celsius and 1 atm of Pressure is
    1.29 kg/m^3.

18. The Speed of Sound in Air : @20*Celsius is 343 m/s.

19. The Density of Water @4*Celsius is 1,000 kg/m^3.

20. The Latent Heat of Fusion of Water is 3.35 * 10^5 J/K.

21. The Latent Heat of Vaporization of Water is 2.26 * 10^6 J/K.

22. The Specific Heat Capacity of Water is 4,186 J / kg*C

23. The Mass of The Earth is 5.98 * 10^{24} kg

Earth's mass is (5.98 \times 10^{24}) kg, which equals about 5.98 sextillion tons, so saying "six sextillion tons" is a very close approximation (only about 0.3% higher).

24. The Equatorial Radius of the Earth is 6.38 *10^6 m.

25. The Earth's Mean Distance from the Sun is $1.50 * 10^{11}$ m.

26. The Mass of The Moon is $7.35 * 10^{22}$ kg.

First convert the Moon's mass into tons:

- Given: 7.35×10^{22} kg
- 1 ton = 1000 kg

"The Moon weighs about 73.5 Quintillion Tons."

73.5 quintillion tons.

27. The Mean Radius of The Moon is $1.74 * 10^{6}$ m.

The Radius of the Moon is 2,160 Miles.

28. The Moon's Mean Distance from Earth is $3.85 * 10^{8}$ m.

29. The Moon's Average Distance from Earth is 236,500 Miles.

30. The Acceleration due to The Moon's Gravity is

$g_{Moon} = 1.6$ m/s.

31. The Mass of The Sun is $m_{Sun} = 1.99 * 10^{8}$ kg.

The Sun weighs about 1.99 octillion tons (metric tons).

The Sun Weighs about 2 Octillion Tons.

32. The Mean Radius of the Sun is $6.96 * 10^{8}$ m.

33. The Acceleration Due to the Sun's Gravity is

$g_{SUN} = 6{,}060\ m/s^2$.