**PHYSICS DATA SHEET**

**Particles**

**Charge** **Mass**

Alpha Particle +2*e* 6.65 × 10–27 kg

Electron –1*e* 9.11 × 10–31 kg

Proton +1*e* 1.67 × 10–27 kg

Neutron 0 1.67 × 10–27 kg

**First-Generation Fermions**

**Charge** **Mass**

Electron –1*e* 0.511 MeV/c2

Positron +1*e* 0.511 MeV/c2

Electron neutrino,  0 < 50 eV/c2

Electron antineutrino,  0 < 50 eV/c2

Up quark, u  ~5 MeV/c2\*

Anti-up quark,   ~5 MeV/c2\*

Down quark, d  ~10 MeV/c2\*

Anti-down quark,   ~10 MeV/c2\*

\*Current models seem to suggest a significantly lower mass of these quarks than those in this table

**Prefixes Used with SI Units**

**Exponential**

**Prefix** **Symbol** **Value**

atto a 10-18

femto f 10-15

pico p 10-12

nano n 10-9

micro  10-6

milli m 10-3

centi c 10-2

deci d 10-1

deka da 101

hecto h 102

kilo k 103

mega M 106

giga G 109

tera T 1012

**Constants**

Acceleration due to gravity

near Earth  = 9.81 m/s2

Gravitational constant 

Radius of the Earth 

Mass of the Earth 

Elementary Charge 

Coulomb’s Law Constant 

Electron Volt 

Index of Refraction of Air 

Speed of Light in Vacuum 

Planck’s Constant 

Atomic Mass Unit 

**Physics Principles**

**0** Uniform motion 

**1** Accelerated motion 

**2** Uniform circular motion 

**3** Work-energy theorem

**4** Conservation of momentum

**5** Conservation of energy

**6** Conservation of mass-energy

**7** Conservation of charge

**8** Conservation of nucleons

**9** Wave-particle duality

**EQUATIONS**

**Quantum Mechanics and Nuclear Physics**

**Waves**

**Kinematics**



**Trigonometry and Geometry**



**Dynamics**



**Electricity and Magnetism**



**Momentum and Energy**



**Graphing Calculator Window Format**



Atomic Physics



**Periodic Table of the Elements**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 H  **1.01**  hydrogen |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | 2 He  **4.00**  helium |
| 3 Li  **6.94**  lithium | 4 Be  **9.01**  beryllium |  |  |  |  |  |  |  |  |  |  | 5 B  **10.81**  boron | 6 C  **12.01**  carbon | 7 N  **14.01**  nitrogen | 8 O  **16.00**  oxygen | 9 F  **19.00**  fluorine | 10 Ne  **20.18**  neon |
| 11 Na  **22.99**  sodium | 12 Mg  **24.31**  magnesium |  |  |  |  |  |  |  |  |  |  | 13 Al  **26.98**  aluminium | 14 Si  **28.09**  silicon | 15 P  **30.97**  phosphorous | 16 S  **32.07**  sulfur | 17 Cl  **35.45**  chlorine | 18 Ar  **39.95**  argon |
| 19 K  **39.10**  potassium | 20 Ca  **40.08**  calcium | 21 Sc  **44.96**  scandium | 22 Ti  **47.87**  titanium | 23 V  **50.94**  vanadium | 24 Cr  **52.00**  chromium | 25 Mn  **54.94**  manganese | 26 Fe  **55.85**  iron | 27 Co  **58.93**  cobalt | 28 Ni  **58.69**  nickel | 29 Cu  **63.55**  copper | 30 Zn  **65.39**  zinc | 31 Ga  **69.72**  gallium | 32 Ge  **72.64**  germanium | 33 As  **74.92**  arsenic | 34 Se  **78.96**  selenium | 35 Br  **79.90**  bromine | 36 Kr  **83.80**  krypton |
| 37 Rb  **85.47**  rubidium | 38 Sr  **87.62**  strontium | 39 Y  **88.91**  yttrium | 40 Zr  **91.22**  zirconium | 41 Nb  **92.91**  niobium | 42 Mo  **95.94**  molybdenum | 43 Tc  **(98)**  technetium | 44 Ru  **101.07**  ruthenium | 45 Rh  **102.91**  rhodium | 46 Pd  **106.42**  palladium | 47 Ag  **107.87**  silver | 48 Cd  **112.41**  cadmium | 49 In  **114.82**  indium | 50 Sn  **118.71**  tin | 51 Sb  **121.75**  antimony | 52 Te  **127.60**  tellurium | 53 I  **126.90**  iodine | 54 Xe  **131.29**  xenon |
| 55 Cs  **132.91**  cesium | 56 Ba  **137.33**  barium | 57-71 | 72 Hf  **178.49**  hafnium | 73 Ta  **180.95**  tantalum | 74 W  **183.84**  tungsten | 75 Re  **186.21**  rhenium | 76 Os  **190.23**  osmium | 77 Ir  **192.22**  iridium | 78 Pt  **195.08**  platinum | 79 Au  **196.97**  gold | 80 Hg  **200.59**  mercury | 81 Tl  **204.38**  thallium | 82 Pb  **207.21**  lead | 83 Bi  **208.98**  bismuth | 84 Po  **(209)**  polonium | 85 At  **(210)**  astatine | 86 Rn  **(222)**  radon |
| 87 Fr  **(223)**  francium | 88 Ra  **(226)**  radium | 89-103 | 104 Rf  **(261)**  rutherfordium | 105 Db  **(262)**  dubnium | 106 Sg  **(266)**  seaborgium | 107 Bh  **(264)**  bohrium | 108 Hs  **(277)**  hassium | 109 Mt  **(268)**  meitnerium | 110 Ds  **(271)**  darmstadtium | 111 Rg  **(272)**  roentgenium | 112Uub  **(285)**  ununbium | 113 Uut  **(284)**  ununtrium | 114Uuq  **(289)**  ununquadium | 115Uup  **(288)**  ununpentium | 116Uuh  **(292)**  ununhexium | 117Uus  **(?)**  ununseptium | 118Uuo  **(294)**  ununoctium |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  | 57 La  **138.91**  lanthanum | 58 Ce  **140.12**  cerium | 59 Pr  **140.91**  praseodymium | 60 Nd  **144.24**  neodymium | 61 Pm  **(145)**  promethium | 62 Sm  **150.36**  samarium | 63 Eu  **151.96**  europium | 64 Gd  **157.25**  gadolinium | 65 Tb  **158.93**  terbium | 66 Dy  **162.50**  dysprosium | 67 Ho  **164.93**  holmium | 68 Er  **167.26**  erbium | 69 Tm  **168.93**  thulium | 70 Yb  **173.04**  ytterbium | 71 Lu  **174.97**  lutetium |
|  |  |  | 89 Ac  **(227)**  actinium | 90 Th  **232.04**  thorium | 91 Pa  **231.04**  protactinium | 92 U  **238.03**  uranium | 93 Np  **(237)**  neptunium | 94 Pu  **(244)**  plutonium | 95 Am  **(243)**  americium | 96 Cm  **(247)**  curium | 97 Bk  **(247)**  berkelium | 98 Cf  **(251)**  californium | 99 Es  **(252)**  einsteinium | 100Fm  **(257)**  fermium | 101Md  **(258)**  mendelevium | 102 No  **(259)**  nobelium | 103 Lr  **(262)**  lawrencium |