

DATA SHEET
COMMON PHYSICAL QUANTITIES

| <i>Quantity</i> | <i>Symbol</i> | <i>Value</i> | <i>Quantity</i> | <i>Symbol</i> | <i>Value</i> |
|-------------------------------------|---------------|---|----------------------------|---------------|---|
| Gravitational acceleration on Earth | g | 9.8 m s^{-2} | Mass of electron | m_e | $9.11 \times 10^{-31} \text{ kg}$ |
| Radius of Earth | R_E | $6.4 \times 10^6 \text{ m}$ | Charge on electron | e | $-1.60 \times 10^{-19} \text{ C}$ |
| Mass of Earth | M_E | $6.0 \times 10^{24} \text{ kg}$ | Mass of neutron | m_n | $1.675 \times 10^{-27} \text{ kg}$ |
| Mass of Moon | M_M | $7.3 \times 10^{22} \text{ kg}$ | Mass of proton | m_p | $1.673 \times 10^{-27} \text{ kg}$ |
| Radius of Moon | R_M | $1.7 \times 10^6 \text{ m}$ | Mass of alpha particle | m_α | $6.645 \times 10^{-27} \text{ kg}$ |
| Mean Radius of Moon Orbit | | $3.84 \times 10^8 \text{ m}$ | Charge on alpha particle | | $3.20 \times 10^{-19} \text{ C}$ |
| Solar radius | | $6.955 \times 10^8 \text{ m}$ | Planck's constant | h | $6.63 \times 10^{-34} \text{ J s}$ |
| Mass of Sun | | $2.0 \times 10^{30} \text{ kg}$ | Permittivity of free space | ϵ_0 | $8.85 \times 10^{-12} \text{ F m}^{-1}$ |
| 1 AU | | $1.5 \times 10^{11} \text{ m}$ | Permeability of free space | μ_0 | $4\pi \times 10^{-7} \text{ H m}^{-1}$ |
| Stefan-Boltzmann constant | σ | $5.67 \times 10^{-8} \text{ W m}^{-2} \text{ K}^{-4}$ | Speed of light in vacuum | c | $3.0 \times 10^8 \text{ m s}^{-1}$ |
| Universal constant of gravitation | G | $6.67 \times 10^{-11} \text{ m}^3 \text{ kg}^{-1} \text{ s}^{-2}$ | Speed of sound in air | v | $3.4 \times 10^2 \text{ m s}^{-1}$ |

REFRACTIVE INDICES

The refractive indices refer to sodium light of wavelength 589 nm and to substances at a temperature of 273 K.

| <i>Substance</i> | <i>Refractive index</i> | <i>Substance</i> | <i>Refractive index</i> |
|------------------|-------------------------|--------------------|-------------------------|
| Diamond | 2.42 | Glycerol | 1.47 |
| Glass | 1.51 | Water | 1.33 |
| Ice | 1.31 | Air | 1.00 |
| Perspex | 1.49 | Magnesium Fluoride | 1.38 |

SPECTRAL LINES

| <i>Element</i> | <i>Wavelength/nm</i> | <i>Colour</i> | <i>Element</i> | <i>Wavelength/nm</i> | <i>Colour</i> |
|----------------|----------------------|---------------|----------------|----------------------|---------------|
| Hydrogen | 656 | Red | Cadmium | 644 | Red |
| | 486 | Blue-green | | 509 | Green |
| | 434 | Blue-violet | | 480 | Blue |
| | 410 | Violet | <i>Lasers</i> | | |
| | 397 | Ultraviolet | <i>Element</i> | <i>Wavelength/nm</i> | <i>Colour</i> |
| | 389 | Ultraviolet | Carbon dioxide | 9550 } 10590 } | Infrared |
| Sodium | 589 | Yellow | Helium-neon | 633 | Red |

PROPERTIES OF SELECTED MATERIALS

| <i>Substance</i> | <i>Density/</i> kg m^{-3} | <i>Melting Point/</i> K | <i>Boiling Point/</i> K | <i>Specific Heat Capacity/</i> $\text{J kg}^{-1} \text{ K}^{-1}$ | <i>Specific Latent Heat of Fusion/</i> J kg^{-1} | <i>Specific Latent Heat of Vaporisation/</i> J kg^{-1} |
|------------------|---------------------------------------|----------------------------|----------------------------|---|--|--|
| Aluminium | 2.70×10^3 | 933 | 2623 | 9.02×10^2 | 3.95×10^5 | .... |
| Copper | 8.96×10^3 | 1357 | 2853 | 3.86×10^2 | 2.05×10^5 | .... |
| Glass | 2.60×10^3 | 1400 | .... | 6.70×10^2 | .... | .... |
| Ice | 9.20×10^2 | 273 | .... | 2.10×10^3 | 3.34×10^5 | .... |
| Glycerol | 1.26×10^3 | 291 | 563 | 2.43×10^3 | 1.81×10^5 | 8.30×10^5 |
| Methanol | 7.91×10^2 | 175 | 338 | 2.52×10^3 | 9.9×10^4 | 1.12×10^6 |
| Sea Water | 1.02×10^3 | 264 | 377 | 3.93×10^3 | .... | .... |
| Water | 1.00×10^3 | 273 | 373 | 4.19×10^3 | 3.34×10^5 | 2.26×10^6 |
| Air | 1.29 | .... | .... | .... | .... | .... |
| Hydrogen | 9.0×10^{-2} | 14 | 20 | 1.43×10^4 | .... | 4.50×10^5 |
| Nitrogen | 1.25 | 63 | 77 | 1.04×10^3 | .... | 2.00×10^5 |
| Oxygen | 1.43 | 55 | 90 | 9.18×10^2 | .... | 2.40×10^4 |

The gas densities refer to a temperature of 273 K and a pressure of $1.01 \times 10^5 \text{ Pa}$.