CHAPTER 3

Tables

These tables are from

Understanding the properties of matter

by Michael de Podesta.

For more details see **www.physicsofmatter.com**

Table 3.1 The SI base units. Notice that, with the exception of the kilogram, the definitions are in terms of physical phenomena and not defining artefacts. Although the definitions seem obscure, the language is carefully chosen in order to make accurate realisations of the standards feasible.

Quantity: **Unit (abbreviation)**	**Definition**
Time: second (s)	The second is the duration of 9,192,631,770 periods of the radiation corresponding to the transition between two hyperfine levels of the ground state of the caesium-133 atom.
Length: metre (m)	The metre is the length of the path travelled by light in vacuum during a time interval 1/299,792,458 of a second. Note: This defines 299,792,458 ms^{-1} as the *exact* speed of light in a vacuum.
Mass: kilogram (kg)	The kilogram is the unit of mass; it is equal to the mass of the international prototype of the kilogram
Electric Current: ampere (A)	The ampere is that constant current which, if maintained in two straight parallel conductors of infinite length, of negligible circular cross-section, and placed 1 metre apart in vacuum, would produce between these conductors a force equal to 2×10^{-7} newton, per metre of length.
Thermodynamic temperature: kelvin (K)	The kelvin, unit of thermodynamic temperature, is the fraction 1/273.16 of the thermodynamic temperature of the triple point of pure water.
Amount of substance: mole (mol)	The mole is the amount of substance of a system which contains as many elementary entities as there are atoms in 0.012 kilogram of carbon 12.
Luminous Intensity: candela (cd)	The candela is the luminous intensity, in a given direction, of a source that emits monochromatic radiation 540×10^{12} hertz and that has a radiant intensity of 1/683 watt per steradian

Table 3.2 SI supplementary units.

Quantity	**Name**	**Symbol**	**Expression in terms of SI base units**
plane angle	radian	rad	$m\ m^{-1} = 1$
solid angle	steradian	sr	$m^2\ m^{-2} = 1$

Table 3.3 SI derived units with special names. The name of the units are all written with lower case letters (with the exception of degree Celsius), but that the symbols for the units have upper case letters: be careful to distinguish between seimens (S) and seconds (s). The symbol for the ohm, **Ω**, is the greek letter 'W', called omega.

Quantity	**Name**	**Symbol**	**Expression in terms of other units**	**Expression in terms of SI base units**
frequency	hertz	Hz		s^{-1}
force	newton	N		m kg s^{-2}
pressure	pascal	Pa	N m^{-2}	m^{-1} kg s^{-2}
stress				
energy	joule	J	N m	m^2 kg s^{-2}
work				
quantity of heat				
power	watt	W	J s^{-1}	m^2 kg s^{-3}
radiant flux				
electric charge	coulomb	C		s A
quantity of electricity				
electrical potential	volt	V	W A^{-1}	m^2 kg s^{-3} A^{-1}
potential difference				
electromotive force				
capacitance	farad	F	C V^{-1}	m^2 kg^{-1} s^4 A^{-1}
electric resistance	ohm	Ω	V A^{-1}	m^2 kg s^{-3} A^2
electric conductance	siemens	S	A V^{-1}	m^2 kg^{-1} s^3 A^{-1}
magnetic flux	weber	Wb	V s	m^2 kg s^{-2} A^{-1}
magnetic flux density	tesla	T	Wb m^{-2}	kg s^{-2} A^{-1}
inductance	henry	H	Wb A^{-1}	m^2 kg s^{-2} A^{-2}
Celsius temperature	degree celsius	°C		K
luminous flux	lumen	lm		cd sr
illuminance	lux	lx	lm m^{-2}	m^{-2} cd sr