

1.1 Use of SI units and their prefixes

SI units

Scientists around the world use the same internationally agreed system of units. These are called SI (Système International) units. The system is built upon seven base units.



SI base units

Quantity	Name of unit	Symbol
length		
	kilogram	
		s
	ampere	
temperature		K
amount of substance		mol
luminous intensity	candela	cd

Note: the knowledge of the candela is not required for this course

(1) Complete the table above by doing some research.

Derived units

Quantities such as speed (ms^{-1}) and density (kgm^{-3}) which are not expressed in a single base unit are expressed in 'derived' units.

(2) Complete the table, below:

Quantity	Symbol	Name of unit	Symbol for unit	Base units
speed or velocity	v		ms^{-1}	ms^{-1}
acceleration	a		ms^{-2}	ms^{-2}
force	F			$kgms^{-2}$
energy	E			kgm^2s^{-2}
power	P		W	kgm^2s^{-3}
pressure	p		Pa	$kgm^{-1}s^{-2}$
frequency	f	hertz	Hz	s^{-1}
charge	Q	coulomb		As
potential difference	V	volt		$A^{-1}kgm^2s^{-3}$
resistance	R		Ω	$A^{-2}kgm^2s^{-3}$
capacitance	C	farad	F	$A^2kg^{-1}m^{-2}s^4$
magnetic flux	B	tesla	T	$A^{-1}kgs^{-2}$

Prefixes

In Physics, we have to deal with quantities from the very large to the very small. A prefix is something that goes in front of a unit and acts as a multiplier. This sheet will give you practice at converting figures between prefixes.

(3)  Complete the table, below:

Symbol	Name	What it means		How to convert	
<i>P</i>	peta	10^{15}	1000000000000000		↓ x1000
<i>T</i>		10^{12}	1000000000000	↑ ÷ 1000	↓ x1000
<i>G</i>		10^9	1000000000	↑ ÷ 1000	↓ x1000
<i>M</i>		10^6	1000000	↑ ÷ 1000	↓ x1000
<i>k</i>	kilo		1000	↑ ÷ 1000	↓ x1000
			1	↑ ÷ 1000	↓ x1000
<i>m</i>		10^{-3}	0.001	↑ ÷ 1000	↓ x1000
μ		10^{-6}	0.000001	↑ ÷ 1000	↓ x1000
<i>n</i>	nano		0.000000001	↑ ÷ 1000	↓ x1000
<i>p</i>	pico		0.000000000001	↑ ÷ 1000	↓ x1000
<i>f</i>	femto		0.000000000000001	↑ ÷ 1000	

(4)  Convert the figures into the prefixes required.

<i>s</i>	<i>ms</i>	μ s	<i>ns</i>	<i>ps</i>
134.6				
96.21				
0.773				

<i>m</i>	<i>km</i>	<i>mm</i>	<i>Mm</i>	<i>Gm</i>
12873				
0.295				
57.23				

<i>kg</i>	<i>Mg</i>	<i>mg</i>	<i>g</i>	<i>Gg</i>
94.76				
0.000765				
823.46				