Cheatography

Units and Measurements Cheat Sheet

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Introduction

Need for measurements:	Physics is a science of measurement. It is to provide a proper description of any natural phenomenon.
Physical quantities:	A quantity which is subjected to measurement may be treated as a physical quantity.
Units of measurement:	>The unit >and numerical value

System of Units

S.No.	Name	Unit	Symbol
1.	length	metre	m
2.	mass	kilogram	kg
3.	time	second	s
4.	electric current	ampere	A
5.	temperature	kelvin	K
6.	amount of substance	mole	mol
7.	luminous intensity	candela	cd
8.	plane angle	radian	rad
9.	solid angle	steradian	sr
.	4 fundamental systems:	i) CGS (cm,gram,sec)	iii) FPS (ft,lb,sec)
.	.	ii) SI (the above table of units)	iv) MKS (m,kg,sec)

Conversions

1 kilo m	10^{3}m
1 centi m	10^{-2}m
1 milli m	10^{-3}m
1 micron	10^{-6}m
1 nano m	10^{-9}m
1 angstrom	10^{-10}m
1 X-unit	10^{-13}m
1 fermi	10^{-15}m
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1 astronomical unit (AU)	1.5×10^{11}m
1 light year (ly)	10^{16}m
1 parallactic sound/parsec (pc)	3.26×10^{16}m

Derived units

Volume	length x breadth x height (m^3)
Density	mass/volume (kg m^{-3})
Velocity	displacement/time (m^{-1})
Acceleration	change in velocity/time (ms^{-2})
Force	mass x acceleration (kg m s^{-2})
Pressure	force/area (N m^{-2})
Work	force x displacement (kg m^2s^{-2})
Power	work/time (J s^{-1})

Measurement of length

Direct methods	Least count= Pitch/ no. of divisions
Vernier calliper	0.01cm
Screw Gauge	0.001cm
Spherometer	0.001cm
Indirect methods	full form
Echo	(reflection)
RADAR	Radio Detection And Ranging
LASER	Light Amplification by Stimulated Emission of Radiation
SONAR	Sound Navigation And Randing

Errors in measurement

Systematic errors	What is it?
Instrumental errors	errors due to defected alignment
Error due to imperfection	imperfection of apparatus
Gross errors	improper adjustment of setup
Random Errors	>
-Small changes in conditions of experiment	-Incorrect judgement of the observer
Methods to express an error	how?
Absolute Error	The difference between the true and measured value
Mean Error	Arithmetic mean of errors of different measurements
Relative/Fractional Error	Ratio of mean error to the true value
Percentage Error	Fractional error multiplied by 100

Significant figures

Rules:	i) decimal point does not effect
ii) all 0's between two non-zeros are significant	iii) all 0's to the right of non-zero digit and before the decimal point are not significant
iv) all 0's after the decimal point are significant	v) all 0's after the decimal point but before non-zeros are not significant

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