- **Dimensions, units, formulae of some quantities:**

Quantity	Formula	Unit	Dimension
Speed	$\frac{\text{Distance}}{\text{Time}}$	ms^{-1}	$[M^0L^1T^{-1}]$
Acceleration	$\frac{\text{Change in velocity}}{\text{Time}}$	ms^{-2}	$[M^0L^1T^{-2}]$
Force	Mass × Acceleration	N (newton)	$[M^1L^1T^{-2}]$
Pressure	$\frac{\text{Force}}{\text{Area}}$	Nm^{-2}	$[M^1L^{-1}T^{-2}]$
Density	$\frac{\text{Mass}}{\text{Volume}}$	$kg\ m^{-3}$	$[M^1L^{-3}T^0]$
Work	Force × distance	joule	$[M^1L^1T^{-2}]\ [L^1] = [M^1L^2T^{-2}]$
Energy	Force × distance	joule	$[M^1L^1T^{-2}]\ [L^1] = [M^1L^2T^{-2}]$
Power	$\frac{\text{Work}}{\text{Time}}$	watt	$[M^1L^2T^{-3}]$
Momentum	Mass × Velocity	$kg\ ms^{-1}$	$[M^1L^1T^{-1}]$
Impulse	Force × Time	Ns	$[M^1L^1T^{-1}]$
Torque	$\vec{\tau} = \vec{r} \times \vec{F}$	N-m	$[M^1L^1T^{-2}]\ [L] = [M^1L^2T^{-2}]$
Moment of inertia (I)	$\sum_{i=1}^{n} m_i r_i^2$	$kg\ m^2$	$[M^1L^2T^0]$
Temperature (T)	--	kelvin	$[M^0L^0T^0K^1]$
Heat (Q)	Energy	joule	$[M^1L^2T^{-2}]$
Specific heat (c)	$\frac{Q}{m\theta}$	joule/kg-K	$[M^0L^2T^{-2}K^{-1}]$
Thermal capacity	--	joule/K	$[M^1L^2T^{-2}\ K^{-1}]$
Latent heat (L)	$\frac{\text{heat}(Q)}{\text{mass}(m)}$	joule/kg	$[M^0L^2T^{-2}]$
Gas constant (R)	$\frac{PV}{T}$	joule/mol-K	$[M^1L^2T^{-2}\ mol^{-1}\ K^{-1}]$
Boltzmann constant (k)	$\frac{R}{N}$, N = Avogadro number	joule/K	$[M^1L^2T^{-2}\ K^{-1}]$
Coefficient of viscosity (η)	$\eta = \frac{F}{A} \cdot \frac{1}{\left(\frac{dv}{dx}\right)}$	$\frac{\text{newton} - \text{second}}{m^2}$	$[M^1L^{-1}T^{-1}]$
Coefficient of thermal conductivity (K)	From $\frac{\Delta Q}{\Delta t} = KA\left(\frac{\Delta T}{\Delta x}\right)$ $K = \frac{\Delta Q}{\Delta t}\left(\frac{\Delta x}{\Delta T}\right) \times \frac{1}{A}$	joule/m-s-K	$[M^1L^1T^{-3}\ K^{-1}]$
Stefan's constant (σ)	$\sigma = \frac{E}{T^4}$	watt/m^2-K^4	$[M^1L^0T^{-3}\ K^{-4}]$
Wien's constant (b)	$b = \lambda_m \times T$	metre-K	$[M^0L^1T^0\ K^1]$
Planck's constant (h)	$\frac{\text{Energy}(E)}{\text{Frequency}(F)}$	joule-s	$[M^1L^2T^{-1}]$
Coefficient of linear Expansion (α)	--	kelvin^{-1}	$[M^0L^0T^0\ K^{-1}]$
Mechanical equivalent of Heat(J)	--	joule/calorie	$[M^0L^0T^0]$

Electric charge (q)	Current × Time	coulomb	$[M^0L^0T^1A^1]$
Electric current (I)	--	ampere	$[M^0L^0T^0A^1]$
Electric potential (V)	$\frac{\text{Work}}{\text{Charge}}$	joule/ coulomb or volt	$[M^1L^2T^{-3}A^{-1}]$
Capacitance (C)	$\frac{\text{Charge}}{\text{P.D.}}$	coulomb/ volt or farad	$[M^{-1}L^{-2}T^4A^2]$
Permittivity of free space (ε_0)	$\frac{q_1 q_2}{4\pi F r^2}$	$\frac{\text{coulomb}^2}{\text{newton} - \text{metre}^2}$	$[M^{-1}L^{-3}T^4A^2]$
Dielectric constant (K) or relative permittivity (ε_r)	$\varepsilon_r = \frac{\varepsilon}{\varepsilon_0}$	Unitless	$[M^0L^0T^0]$
Resistance (R)	$\frac{\text{P.D.}}{\text{Current}}$	volt/ampere or ohm	$[M^1L^2T^{-3}A^{-2}]$
Resistivity or Specific resistance (ρ)	$\frac{Ra}{l}$	ohm-metre	$[M^1L^3T^{-3}A^{-2}]$
Coefficient of Self-induction (L)	$\frac{(w/q)dt}{dI}$	$\frac{\text{volt} - \text{second}}{\text{ampere}}$ or henry or ohm-second	$[M^1L^2T^{-2}A^{-2}]$
Coefficient of mutual inductance (M)	$\frac{e\,dt}{dI}$	henry	$[M^1L^2T^{-2}A^{-2}]$
Magnetic flux (ϕ)	$d\phi = \frac{w\,dt}{q}$	volt-second or weber	$[M^1L^2T^{-2}A^{-1}]$
Magnetic induction (B)	$\frac{F}{qv}$	$\frac{\text{newton}}{\text{ampere} - \text{metre}}$ or $\frac{\text{joule}}{\text{ampere} - \text{metre}^2}$ or $\frac{\text{volt} - \text{second}}{\text{metre}^2}$ or tesla	$[M^1L^0T^{-2}A^{-1}]$
Magnetic intensity (H)	$\frac{I\,dl}{r^2}$	ampere/ metre	$[M^0L^{-1}T^0A^1]$
Magnetic dipole moment (M)	IA	ampere-metre^2	$[M^0L^2T^0A^1]$
Permeability of free space (μ_0)	$\mu_0 = \frac{4\pi r^2 dB}{I(dl)\sin\theta}$	$\frac{\text{newton}}{\text{ampere}^2}$ or $\frac{\text{joule}}{\text{ampere}^2 - \text{metre}}$ or $\frac{\text{volt} - \text{second}}{\text{ampere} - \text{metre}}$ or $\frac{\text{ohm} - \text{second}}{\text{metre}}$ or $\frac{\text{henry}}{\text{metre}}$	$[M^1L^1T^{-2}A^{-2}]$
Surface charge density(σ)	$\frac{\text{charge}}{\text{area}}$	coulomb metre^{-2}	$[M^0L^{-2}T^1A^1]$
Electric dipole moment (p)	q(2a)	coulomb – metre	$[M^0L^1T^1A^1]$
Conductance	$\frac{1}{R}$	ohm^{-1}	$[M^{-1}L^{-2}T^3A^2]$
Conductivity (σ)	$\frac{1}{\rho}$	ohm^{-1}metre^{-1}	$[M^{-1}L^{-3}T^3A^2]$
Current density (J)	Current per unit area	ampere/m^2	$[M^0L^{-2}T^0A^1]$
Intensity of electric field (E)	$\frac{\text{Force}}{\text{Charge}}$	volt/metre, newton/coulomb	$[M^1L^1T^{-3}A^{-1}]$
Rydberg constant (R)	$\frac{2\pi^2 mk^2e^4}{ch^3}$; $k = \frac{1}{4\pi\varepsilon_0}$	m^{-1}	$[M^0L^{-1}T^0]$

- **Quantities having same dimensions:**

Dimension	Quantity
$[M^0L^0T^{-1}]$	Frequency, angular frequency, angular velocity, velocity gradient and decay constant
$[M^1L^2T^{-2}]$	Work, internal energy, potential energy, kinetic energy, torque, moment of force
$[M^1L^{-1}T^{-2}]$	Pressure, stress, Young's modulus, bulk modulus, modulus of rigidity, energy density
$[M^1L^1T^{-1}]$	Momentum, impulse
$[M^0L^1T^{-2}]$	Acceleration due to gravity, gravitational field intensity
$[M^1L^1T^{-2}]$	Thrust, force, weight, energy gradient
$[M^1L^2T^{-1}]$	Angular momentum and Planck's constant
$[M^1L^0T^{-2}]$	Surface tension, Surface energy (energy per unit area), spring constant
$[M^0L^0T^0]$	Strain, refractive index, relative density, angle, solid angle, distance gradient, relative permittivity (dielectric constant), relative permeability, specific gravity, Poisson's ratio, Reynold's number, all the trigonometric ratios, magnetic susceptibility etc.
$[M^0L^2T^{-2}]$	Latent heat and gravitational potential
$[M^1L^2T^{-2}K^{-1}]$	Thermal capacity, Boltzmann constant and entropy
$[M^0L^0T^1]$	$\sqrt{l/g}$, $\sqrt{m/k}$, $\sqrt{R/g}$, where l = length g = acceleration due to gravity, m = mass, k = spring constant, R = Radius of earth
$[M^0L^0T^1]$	L/R, $\sqrt{LC}$, RC where L = inductance, R = resistance, C = capacitance
$[M^1L^2T^{-2}]$	I^2Rt, $\frac{V^2}{R}t$, VIt, qV, LI^2, $\frac{q^2}{C}$, CV^2 where I = current, t = time, q = charge, L = inductance, C = capacitance, R = resistance