Dimensional Formulae of Physical Quantities

S.No	Physical Quantity	Relationship with other physical quantities	Remark	Dimensional Formula
1.	Area	Length × breadth		$[M^0 L^2 T^0]$
2.	Volume	Length × breadth × height		$[M L^3 T^0]$
3.	Mass density	Mass/volume		$[M L^{-3} T^0]$
4.	Frequency	1/time period		$[M^0 L^0 T^{-1}]$
5.	Velocity, speed	Displacement/time		$[M^0 L T^{-1}]$
6.	Acceleration	Velocity/time		$[M^0 L T^{-2}]$
7.	Force	Mass × Acceleration		$[M L T^{-2}]$
8.	Impulse	Force × Time		$[M L T^{-1}]$
9.	Work, Energy	Force × Distance		$[M L^2 T^{-2}]$
10.	Power	Work/Time		$[M L^2 T^{-3}]$
11.	Momentum	Mass × Velocity		$[M L T^{-1}]$
12.	Pressure, stress	Force/Area		$[M L^{-1} T^2]$
13.	Strain	$\frac{\text{change in dimension}}{\text{Original dimension}}$		$[M^0 L^0 T^0]$
14.	Modulus of elasticity	Stress/Strain		$[M L^{-1} T^{-2}]$
15.	Surface tension	Force/Length		$[M L^0 T^{-2}]$
16.	Surface energy	Energy/Area		$[M L^0 T^{-2}]$
17.	Velocity gradient	Velocity/distance		$[M^0 L^0 T^{-1}]$
18.	Pressure gradient	Pressure/distance		$[M L^{-2} T^{-2}]$
19.	Pressure energy	Pressure × volume		$[M L^2 T^{-2}]$
20.	Coefficient of viscosity	Force/area × velocity gradient		$[M L^{-1} T^{-1}]$
21.	Angle, Angular displacement	Arc/radius		$[M^0 L^0 T^0]$
22.	Trigonometric ratio ($\sin\theta$, $\cos\theta$, $\tan\theta$, etc).	Length/length		$[M^0 L^0 T^0]$
23.	Angular velocity	Angle/time		$[M^0 L^0 T^{-1}]$
24.	Angular acceleration	Angular velocity/time		$[M^0 L^0 T^{-2}]$
25.	Radius of gyration	Distance		$[M^0 L T^0]$
26.	Moment of inertia	Mass × (radius of gyration)^2		$[M L^2 T^0]$

27.	Angular momentum	Moment of inertial × angular velocity		$[M\ L^2\ T^{-1}]$
28.	Moment of force, moment of couple	Force × distance		$[M\ L^2\ T^{-2}]$
29.	Torque	Angular momentum/time Or Force × distance		$[M\ L^2\ T^{-2}]$
30.	Angular frequency	$2\pi \times$ Frequency		$[M^0\ L^0\ T^{-1}]$
31.	Wavelength	Distance		$[M^0\ L\ T^0]$
32.	Hubble constant	Recession speed/distance		$[M^0\ L^0\ T^{-1}]$
33.	Intensity of wave	(Energy/time)/area		$[M\ L^0\ T^{-3}]$
34.	Radiation pressure	$\frac{\text{Intensity of wave}}{\text{Speed of light}}$		$[M\ L^{-1}\ T^{-2}]$
35.	Energy density	Energy/volume		$[M\ L^{-1}\ T^{-2}]$
36.	Critical velocity	$\frac{\text{Reynold's number} \times \text{coefficient of viscocity}}{\text{Mass density} \times \text{radius}}$		$[M^0\ L\ T^{-1}]$
37.	Escape velocity	$(2 \times$ acceleration due to gravity $\times$ earth's radius$)^{1/2}$		$[M^0\ L\ T^{-1}]$
38.	Heat energy, internal energy	Work (= Force × distance)		$[M\ L^2\ T^{-2}]$
39.	Kinetic energy	$(1/2)$ mass $\times$ $(\text{velocity})^2$		$[M\ L^2\ T^{-2}]$
40.	Potential energy	Mass × acceleration due to gravity × height		
41.	Rotational kinetic energy	½ × moment of inertia × $(\text{angular velocity})^2$		$[M\ L^2\ T^{-2}]$
42.	Efficiency	$\frac{\text{output work or energy}}{\text{Input work or energy}}$		$[M^0\ L^0\ T^0]$
43.	Angular impulse	Torque × time		$[M\ L^2\ T^{-1}]$
44.	Gravitational constant	$\frac{\text{Force} \times (\text{distance})^2}{\text{mass} \times \text{mass}}$		$[M^{-1}\ L^3\ T^{-2}]$
45.	Planck constant	Energy/frequency		$[M\ L^2\ T^{-1}]$
46.	Heat capacity, entropy	Heat energy/temperature		$[M\ L^2\ T^{-2}\ K^{-1}]$
47.	Specific heat capacity	$\frac{\text{Heat Energy}}{\text{Mass} \times \text{temperature}}$		$[M^0\ L^2\ T^{-2}\ K^{-1}]$
48.	Latent heat	Heat energy/mass		$[M^0\ L^2\ T^{-2}]$
49.	Thermal expansion coefficient or thermal expansivity	$\frac{\text{change in dimension}}{\text{Original dimension} \times \text{temperature}}$		$[M^0\ L^0\ K^{-1}]$

50.	Thermal conductivity	$\frac{\text{Heat energy} \times \text{thickness}}{\text{Area} \times \text{temperature} \times \text{time}}$		$[M\ L\ T^{-3}\ K^{-1}]$
51.	Bulk modulus or (compressibility)$^{-1}$	$\frac{\text{volume} \times (\text{change in pressure})}{(\text{change in volume})}$		$[M\ L^{-1}\ T^{-2}]$
52.	Centripetal acceleration	(Velocity)^2 / radius		$[M^0\ L\ T^{-2}]$
53.	Stefan constant	$\frac{(\text{Energ/area} \times \text{time})}{(\text{Temperature})^4}$		$[M\ L^0\ T^{-3}\ K^{-4}]$
54.	Wien constant	Wavelength $\times$ temperature		$[M^0\ LT^0K]$
55.	Boltzmann constant	Energy/temperature		$[ML^2\ T^{-2}\ K^{-1}]$
56.	Universal gas constant	$\frac{\text{Pressure} \times \text{volume}}{\text{mole} \times \text{temperature}}$		$[ML^2\ T^{-2}\ K^{-1}\ mol^{-1}]$
57.	Charge	Current $\times$ time		$[M^0\ L^0\ TA]$
58.	Current density	Current/area		$[M^0\ L^{-2}\ T^0A]$
59.	Voltage, electric potential, electromotive force	Work/charge		$[ML^2\ T^{-3}A^{-1}]$
60.	Resistance	$\frac{\text{Potential difference}}{\text{Current}}$		$[ML^2\ T^{-3}A^{-2}]$
61.	Capacitance	Charge/potential difference		$[M^{-1}\ L^{-2}\ T^4A^2]$
62.	Electrical resistivity or (electrical conductivity)$^{-1}$	$\frac{\text{Resistance} \times \text{area}}{\text{length}}$		$[ML^3\ T^{-3}A^{-2}]$
63.	Electric field	Electrical force/charge		$[MLT^{-3}A^{-1}]$
64.	Electric flux	Electric field $\times$ area		$[ML^3\ T^{-3}A^{-1}]$
65.	Electric dipole moment	Torque/electric field		$[M^0\ LTA]$
66.	Electric field strength or electric intensity	$\frac{\text{Potential difference}}{\text{distance}}$		$[MLT^{-3}\ A^{-1}]$
67.	Magnetic field, magnetic flux density, magnetic induction	$\frac{\text{Force}}{\text{Current} \times \text{length}}$		$[ML^0\ T^{-2}A^{-1}]$
68.	Magnetic flux	Magnetic field $\times$ area		$[ML^2\ T^{-2}A^{-1}]$
69.	Inductance	$\frac{\text{Magnetic flux}}{\text{Current}}$		$[ML^2\ T^{-2}A^{-2}]$
70.	Magnetic dipole moment	Torque/magnetic field or current $\times$ area		$[M^0\ L^2\ T^0A]$
71.	Magnetic field strength, magnetic intensity or magnetic moment density	$\frac{\text{Magnetic moment}}{\text{Volume}}$		$[M^0\ L^{-1}\ T^0A]$

72.	Permittivity constant (or free space)	$\frac{\text{Charge} \times \text{charge}}{4\pi \times \text{electric force} \times (\text{distance})^2}$		$[M^{-1} L^{-3} T^4 A^2]$
73.	Permeability constant (of free space)	$\frac{2\pi \times \text{force} \times \text{distance}}{\text{current} \times \text{current length}}$		$[MLT^{-2}A^{-2}]$
74.	Refractive index	$\frac{\text{Speed of light in vacuum}}{\text{Speed of light in medium}}$		$[M^0 L^0 T^0]$
75.	Faraday constant	Avogadro constant × elementary charge		$[M^0 L^0 TA\ mol^{-1}]$
76.	Wave number	2π/wavelength		$[M^0 L^{-1} T^0]$
77.	Radiant flux, Radiant power	Energy emitted/time		$[M L^2 T^{-3}]$
78.	Luminosity of radiant flux or radiant intensity	$\frac{\text{Radiant power or radiant flus c}}{\text{Solid angle}}$		$[M L^2 T^{-3}]$
79.	Luminous power or luminous flux of source	$\frac{\text{Luminous energy emitted}}{\text{time}}$		$[M L^2 T^{-3}]$
80.	Luminous intensity of illuminating power of source	$\frac{\text{Luminous flux}}{\text{Solid angle}}$		$[M L^2 T^{-3}]$
81.	Intensity of illumination or luminance	$\frac{\text{Luminous intensity}}{(\text{distance})^2}$		$[M L^0 T^{-3}]$
82.	Relative luminosity	$\frac{\text{Luminous flux of a source of given wave length}}{\text{luminous flux of peak sensitivity wavelength } (555\text{nm}) \text{ sourc e of same power}}$		$[M^0 L^0 T^0]$
83.	Luminous efficiency	$\frac{\text{Total luminous flux}}{\text{Total radiant flux}}$		$[M^0 L^0 T^0]$
84.	Illuminance or illumination	$\frac{\text{Luminous flux incident}}{\text{area}}$		$[M L^0 T^{-3}]$
85.	Mass defect	(sum of masses of nucleons) – (mass of the nucleus)		$[M L^0 T^0]$
86.	Binding energy of nucleus	Mass defect × (speed of light in vacuum)^2		$[ML^2 T^{-2}]$
87.	Decay constant	0.693/half life		$[M^0 L^0 T^{-1}]$
88.	Resonant frequency	$(\text{Inductance} \times \text{capacitance})^{-\frac{1}{2}}$		$[M^0 L^0 A^0 T^{-1}]$
89.	Quality factor or Q-factor of coil	$\frac{\text{Resonant frequency} \times \text{inductance}}{\text{Resistance}}$		$[M^0 L^0 T^0]$
90.	Power of lens	(Focal length)$^{-1}$		$[M^0 L^{-1} T^0]$
91.	Magnification	$\frac{\text{Image distance}}{\text{Object distance}}$		$[M^0 L^0 T^0]$

92.	Fluid flow rate	$\frac{(\pi/8)(\text{pressure})\times(\text{radius})^4}{(\text{viscosity coefficient})\times(\text{length})}$		$[M^0 L^3 T^{-1}]$
93.	Capacitive reactance	(Angular frequency × capacitance)$^{-1}$		$[ML^2 T^{-3}A^{-2}]$
94.	Inductive reactance	(Angular frequency × inductance)		$[ML^2 T^{-3}A^{-2}]$