Illustration 2

The acceleration due to gravity is 9.8 m s^{-2}. Give its value in ft s^{-2}.

Soln. : As 1 m = 3.2 ft

$\therefore$ 9.8 m s^{-2} = 9.8 × 3.28 ft/sec^2 = 32.14 ft s^{-2} ≈ 32 ft s^{-2}.

DIMENSION OF A PHYSICAL QUANTITY

- All physical quantities can be expressed in terms of the seven fundamental units. We call these seven physical quantities as seven dimensions of the physical world. So, dimensions of a physical quantity are the powers (or exponents) to which the base quantities are raised to represented that quantity. For example,

$$\text{Acceleration} = \frac{\text{Velocity}}{\text{Time}}$$

$$\therefore \text{ Dimensions of acceleration } = \frac{\text{Velocity dimensions}}{\text{Time dimensions}}$$

$$\text{Dimension of Velocity} = \frac{\text{Dimension of length}}{\text{Dimension of time}} = \frac{L}{T} = [LT^{-1}]$$

$\therefore$ Dimensions of acceleration

$$= \frac{LT^{-1}}{T} = LT^{-2} = M^0L^1T^{-2}$$

Hence the dimensions of acceleration are zero in mass, 1 inch length and −2 in time.

Dimensional Formula and Dimensional Equation

- The dimensional formula of any physical quantity is that expression which represents how and which of the base quantities are included in that quantity. It is written by enclosing the symbols for base quantities with appropriate powers in square brackets i.e. [ ]

  e.g. Dimensional formula of acceleration is $[M^0L^1T^{-2}]$.

- The equation obtained by equating a physical quantity with its dimensional formula is called a **dimensional equation.**

  e.g. Dimensional equation for acceleration is

  $$[a] = [M^0L^1T^{-2}]$$

  Similarly, dimensional equation for density is

  $$[\rho] = [M^1L^{-3}T^0]$$

The dimensional formulae and SI units of physical quantities are as shown in the table.

S. No.	Physical quantity	Relation with other physical quantities	Dimensions	Dimensional formula	SI unit
1.	Area	Length × Breadth	[L] × [L]	$[M^0L^2T^0]$	m^2
2.	Volume	Length × Breadth × Height	[L] × [L] × [L]	$[M^0L^3T^0]$	m^3
3.	Density	$\frac{\text{Mass}}{\text{Volume}}$	$\frac{[M]}{[L^3]}$	$[ML^{-3}T^0]$	kg m^{-3}
4.	Frequency	$\frac{1}{\text{Time period}}$	$\frac{1}{[T]}$	$[M^0L^0T^{-1}]$	s^{-1} or Hz (hertz)
5.	Speed/Velocity	$\frac{\text{Distance/Displacement}}{\text{Time}}$	$\frac{[L]}{[T]}$	$[M^0LT^{-1}]$	m s^{-1}
6.	Acceleration	$\frac{\text{Velocity}}{\text{Time}}$	$\frac{[LT^{-1}]}{[T]}$	$[M^0LT^{-2}]$	m s^{-2}
7.	Force	Mass × Acceleration	$[M][LT^{-2}]$	$[MLT^{-2}]$	N (newton)
8.	Impulse	Force × Time	$[MLT^{-2}][T]$	$[MLT^{-1}]$	N s
9.	Work	Force × Distance	$[MLT^{-2}][L]$	$[ML^2T^{-2}]$	J (joule)
10.	Energy	Work	$[ML^2T^{-2}]$	$[ML^2T^{-2}]$	J
11.	Power	$\frac{\text{Work}}{\text{Time}}$	$\frac{[ML^2T^{-2}]}{[T]}$	$[ML^2T^{-3}]$	W (watt)
12.	Momentum	Mass × Velocity	$[M][LT^{-1}]$	$[MLT^{-1}]$	kg m s^{-1}
13.	Pressure, stress	$\frac{\text{Force}}{\text{Area}}$	$\frac{[MLT^{-2}]}{[L^2]}$	$[ML^{-1}T^{-2}]$	N m^{-2} or Pa (Pascal)
14.	Strain	$\frac{\text{Change in dimension}}{\text{Original dimension}}$	$\frac{[L]}{[L]}$	$[M^0L^0T^0]$	No units
15.	Modulus of elasticity	$\frac{\text{Stress}}{\text{Strain}}$	$\frac{[ML^{-1}T^{-2}]}{[M^0L^0T^0]}$	$[ML^{-1}T^{-2}]$	N m^{-2}
16.	Surface tension	$\frac{\text{Force}}{\text{Length}}$	$\frac{[MLT^{-2}]}{[L]}$	$[ML^0T^{-2}]$	N m^{-1}

17.	Specific gravity/relative density	$\frac{\text{Density of body}}{\text{Density of water at 4°C}}$	$\frac{[ML^{-3}]}{[ML^{-3}]}$	$[M^0L^0T^0]$	No units
18.	Velocity gradient	$\frac{\text{Velocity}}{\text{Distance}}$	$\frac{[LT^{-1}]}{[L]}$	$[M^0L^0T^{-1}]$	s^{-1}
19.	Pressure gradient	$\frac{\text{Pressure}}{\text{Distance}}$	$\frac{[ML^{-1}T^{-2}]}{[L]}$	$[ML^{-2}T^{-2}]$	$N\ m^{-3}$
20.	Pressure energy	Pressure × Volume	$[ML^{-1}T^{-2}][L^3]$	$[ML^2T^{-2}]$	J
21.	Coefficient of viscosity	$\frac{\text{Force}}{\text{Area} \times \text{velocity gradient}}$	$\frac{[MLT^{-2}]}{[L^2][LT^{-1}/L]}$	$[ML^{-1}T^{-1}]$	Pas (Pascal second)
22.	Angle, Angular displacement	$\frac{\text{Arc}}{\text{Radius}}$	$\frac{[L]}{[L]}$	$[M^0L^0T^0]$	rad (radian)
23.	Trigonometric ratio (sinθ, cosθ, tanθ etc.)	$\frac{\text{Length}}{\text{Length}}$	$\frac{[L]}{[L]}$	$[M^0L^0T^0]$	No units
24.	Angular velocity	$\frac{\text{Angle}}{\text{Time}}$	$\frac{[M^0L^0T^0]}{[T]}$	$[M^0L^0T^{-1}]$	$rad\ s^{-1}$
25.	Angular acceleration	$\frac{\text{Angular velocity}}{\text{Time}}$	$\frac{[T^{-1}]}{[T]}$	$[M^0L^0T^{-2}]$	$rad\ s^{-2}$
26.	Radius of gyration	Distance	[L]	$[M^0LT^0]$	m
27.	Moment of inertia	Mass × (Radius of gyration)^2	$[M][L^2]$	$[ML^2T^0]$	$kg\ m^2$
28.	Angular momentum	Moment of inertia × Angular velocity	$[ML^2][T^{-1}]$	$[ML^2T^{-1}]$	$kg\ m^2\ s^{-1}$
29.	Moment of force, moment of couple	Force × Distance	$[MLT^{-2}][L]$	$[ML^2T^{-2}]$	N m
30.	Torque	Force × Distance	$[MLT^{-2}][L]$	$[ML^2T^{-2}]$	N m
31.	Angular frequency	2π × Frequency	$[T^{-1}]$	$[M^0L^0T^{-1}]$	$rad\ s^{-1}$
32.	Wavelength	Distance	[L]	$[M^0LT^0]$	m
33.	Hubble constant	$\frac{\text{Recession speed}}{\text{Distance}}$	$\frac{[LT^{-1}]}{[L]}$	$[M^0L^0T^{-1}]$	s^{-1}
34.	Intensity of wave	$\frac{\text{Energy}}{\text{Time} \times \text{area}}$	$\frac{[ML^2T^{-2}]}{[T][L^2]}$	$[ML^0T^{-3}]$	$W\ m^{-2}$
35.	Radiation pressure	$\frac{\text{Intensity of wave}}{\text{Speed of light}}$	$\frac{[ML^0T^{-3}]}{[LT^{-1}]}$	$[ML^{-1}T^{-2}]$	$N\ m^{-2}$
36.	Energy density	$\frac{\text{Energy}}{\text{Volume}}$	$\frac{[ML^2T^{-2}]}{[L^3]}$	$[ML^{-1}T^{-2}]$	$J\ m^{-3}$
37.	Critical velocity	$\frac{\text{Reynold's number} \times \text{Coefficient of viscosity}}{\text{Density} \times \text{Radius}}$	$\frac{[M^0L^0T^0][ML^{-1}T^{-1}]}{[ML^{-3}][L]}$	$[M^0LT^{-1}]$	$m\ s^{-1}$

38.	Escape velocity	(2 × Acceleration due to gravity × Earth's radius)$^{1/2}$	$[LT^{-2}]^{1/2} \times [L]^{1/2}$	$[M^0LT^{-1}]$	m s^{-1}
39.	Heat energy, internal energy	Energy	$[ML^2T^{-2}]$	$[ML^2T^{-2}]$	J
40.	Kinetic energy	$\frac{1}{2}$ × Mass × (Velocity)^2	$[M][LT^{-1}]^2$	$[ML^2T^{-2}]$	J
41.	Potential energy	Mass × Acceleration due to gravity × Height	$[M][LT^{-2}][L]$	$[ML^2T^{-2}]$	J
42.	Rotational kinetic energy	$\frac{1}{2}$ × Moment of inertia × (Angular velocity)^2	$[ML^2][T^{-1}]^2$	$[ML^2T^{-2}]$	J
43.	Efficiency	$\frac{\text{Output work or energy}}{\text{Input work or energy}}$	$\frac{[ML^2T^{-2}]}{[ML^2T^{-2}]}$	$[M^0L^0T^0]$	No units
44.	Angular impulse	Torque × Time	$[ML^2T^{-2}][T]$	$[ML^2T^{-1}]$	kg m^2 s^{-1}
45.	Gravitational constant	$\frac{\text{Force} \times (\text{Distance})^2}{\text{Mass} \times \text{Mass}}$	$\frac{[MLT^{-2}][L^2]}{[M][M]}$	$[M^{-1}L^3T^{-2}]$	N m^2 kg^{-2}
46.	Planck's constant	$\frac{\text{Energy}}{\text{Frequency}}$	$\frac{[ML^2T^{-2}]}{[T^{-1}]}$	$[ML^2T^{-1}]$	J s
47.	Heat capacity, entropy	$\frac{\text{Heat energy}}{\text{Temperature}}$	$\frac{[ML^2T^{-2}]}{[K]}$	$[ML^2T^{-2}K^{-1}]$	J K^{-1}
48.	Specific heat capacity	$\frac{\text{Heat energy}}{\text{Mass} \times \text{Temperature}}$	$\frac{[ML^2T^{-2}]}{[M][K]}$	$[M^0L^2T^{-2}K^{-1}]$	J kg^{-1} K^{-1}
49.	Latent heat	$\frac{\text{Heat energy}}{\text{Mass}}$	$\frac{[ML^2T^{-2}]}{[M]}$	$[M^0L^2T^{-2}]$	J kg^{-1}
50.	Thermal expansion coefficient or thermal expansivity	$\frac{\text{Change in dimension}}{\text{Original dimension} \times \text{Temperature}}$	$\frac{[L]}{[L][K]}$	$[M^0L^0T^0K^{-1}]$	K^{-1}
51.	Coefficient of thermal conductivity	$\frac{\text{Heat energy} \times \text{Thickness}}{\text{Area} \times \text{Temperature} \times \text{Time}}$	$\frac{[ML^2T^{-2}][L]}{[L^2][K][T]}$	$[MLT^{-3}K^{-1}]$	W m^{-1} K^{-1}
52.	Bulk modulus	$\frac{\text{Volume} \times (\text{Change in pressure})}{\text{Change in volume}}$	$\frac{[L^3][ML^{-1}T^{-2}]}{[L^3]}$	$[ML^{-1}T^{-2}]$	N m^{-2}
53.	Centripetal acceleration	$\frac{(\text{Velocity})^2}{\text{Radius}}$	$\frac{[LT^{-1}]^2}{[L]}$	$[M^0LT^{-2}]$	m s^{-2}
54.	Stefan's constant	$\frac{\text{Energy}}{(\text{Area}) \times (\text{time}) \times (\text{temperature})^4}$	$\frac{[ML^2T^{-2}]}{[L^2][T][K]^4}$	$[ML^0T^{-3}K^{-4}]$	W m^{-2} K^{-4}
55.	Wien's constant	Wavelength × Temperature	$[L][K]$	$[M^0LT^0K]$	m K

56.	Universal gas constant	$\frac{\text{Pressure} \times \text{Volume}}{\text{Mole} \times \text{Temperature}}$	$\frac{[ML^{-1}T^{-2}][L^3]}{[mol][K]}$	$[ML^2T^{-2}K^{-1}mol^{-1}]$	$J\ K^{-1}\ mol^{-1}$
57.	Boltzmann constant	$\frac{\text{Universal gas constant}}{\text{Avogadro's number}}$	$\frac{[ML^2T^{-2}K^{-1}mol^{-1}]}{[mol^{-1}]}$	$[ML^2T^{-2}K^{-1}]$	$J\ K^{-1}$
58.	Charge	Current × Time	[A][T]	$[M^0L^0TA]$	C (coulomb)
59.	Current density	$\frac{\text{Current}}{\text{Area}}$	$\frac{[A]}{[L^2]}$	$[M^0L^{-2}T^0A]$	$A\ m^{-2}$
60.	Electric potential, electromotive force, voltage	$\frac{\text{Work}}{\text{Charge}}$	$\frac{[ML^2T^{-2}]}{[AT]}$	$[ML^2T^{-3}A^{-1}]$	V (volt)
61.	Resistance	$\frac{\text{Potential difference}}{\text{Current}}$	$\frac{[ML^2T^{-3}A^{-1}]}{[A]}$	$[ML^2T^{-3}A^{-2}]$	Ω (ohm)
62.	Capacitance	$\frac{\text{Charge}}{\text{Potential difference}}$	$\frac{[AT]}{[ML^2T^{-3}A^{-1}]}$	$[M^{-1}L^{-2}T^4A^2]$	F (farad)
63.	Electric field	$\frac{\text{Electrical force}}{\text{Charge}}$	$\frac{[MLT^{-2}]}{[AT]}$	$[MLT^{-3}A^{-1}]$	$N\ C^{-1}$
64.	Electric flux	Electric field × Area	$[MLT^{-3}A^{-1}][L^2]$	$[ML^3T^{-3}A^{-1}]$	$N\ m^2\ C^{-1}$
65.	Electric dipole moment	Charge × Length	[AT][L]	$[M^0LTA]$	C m
66.	Electric field strength or electric intensity	$\frac{\text{Potential difference}}{\text{Distance}}$	$\frac{[ML^2T^{-3}A^{-1}]}{[L]}$	$[MLT^{-3}A^{-1}]$	$V\ m^{-1}$
67.	Magnetic field, magnetic flux density, magnetic induction	$\frac{\text{Force}}{\text{Current} \times \text{Length}}$	$\frac{[MLT^{-2}]}{[A][L]}$	$[ML^0T^{-2}A^{-1}]$	T (tesla)
68.	Magnetic flux	Magnetic field × Area	$[ML^0T^{-2}A^{-1}][L^2]$	$[ML^2T^{-2}A^{-1}]$	Wb (weber)
69.	Inductance	$\frac{\text{Magnetic flux}}{\text{Current}}$	$\frac{[ML^2T^{-2}A^{-1}]}{[A]}$	$[ML^2T^{-2}A^{-2}]$	H (henry)
70.	Magnetic dipole moment	Current × Area	$[A][L^2]$	$[M^0L^2T^0A]$	$A\ m^2$
71.	Intensity of magnetisation	$\frac{\text{Magnetic moment}}{\text{Volume}}$	$\frac{[L^2A]}{[L^3]}$	$[M^0L^{-1}T^0A]$	$A\ m^{-1}$
72.	Permittivity of free space	$\frac{\text{Charge} \times \text{Charge}}{4\pi \times \text{Electric force} \times (\text{Distance})^2}$	$\frac{[AT][AT]}{[MLT^{-2}][L]^2}$	$[M^{-1}L^{-3}T^4A^2]$	$C^2\ N^{-1}\ m^{-2}$
73.	Permeability of free space	$\frac{2\pi \times \text{Force} \times \text{Distance}}{\text{Current} \times \text{Current} \times \text{Length}}$	$\frac{[MLT^{-2}][L]}{[A][A][L]}$	$[MLT^{-2}A^{-2}]$	$T\ m\ A^{-1}$
74.	Refractive index	$\frac{\text{Speed of light in vacuum}}{\text{Speed of light in medium}}$	$\frac{[LT^{-1}]}{[LT^{-1}]}$	$[M^0L^0T^0]$	No units

75.	Faraday constant	Avogadro's number × Elementary charge	$[mol^{-1}][AT]$	$[M^0L^0TA mol^{-1}]$	$C\ mol^{-1}$
76.	Wave number	$\frac{2\pi}{\text{Wavelength}}$	$\frac{1}{[L]}$	$[M^0L^{-1}T^0]$	$rad\ m^{-1}$
77.	Radiant flux, radiant power	$\frac{\text{Energy emitted}}{\text{Time}}$	$\frac{[ML^2T^{-2}]}{[T]}$	$[ML^2T^{-3}]$	watt
78.	Luminosity of radiant flux or radiant intensity	Radiant power or $\frac{\text{Radiant flux of source}}{\text{Solid angle}}$	$\frac{[ML^2T^{-3}]}{[M^0L^0T^0]}$	$[ML^2T^{-3}]$	$watt\ sr^{-1}$
79.	Luminous power or luminous flux of source	$\frac{\text{Luminous energy emitted}}{\text{Time}}$	$\frac{[ML^2T^{-2}]}{[T]}$	$[ML^2T^{-3}]$	lumen
80.	Relative luminosity	$\frac{\text{Luminous flux of a source of given wavelenth}}{\text{Luminous flux of peak sensitivity wavelength (555 nm) source of same power}}$	$\frac{[ML^2T^{-3}]}{[ML^2L^{-3}]}$	$[M^0L^0T^0]$	No units
81.	Luminous efficiency	$\frac{\text{Total luminous flux}}{\text{Total radiant flux}}$	$\frac{[ML^2T^{-3}]}{[ML^2T^{-3}]}$	$[M^0L^0T^0]$	No units
82.	Illuminance or illumination	$\frac{\text{Luminous flux incident}}{\text{Area}}$	$\frac{[ML^2T^{-3}]}{[L^2]}$	$[ML^0T^{-3}]$	lux
83.	Decay constant	$\frac{0.693}{\text{Half life}}$	$[T^{-1}]$	$[M^0L^0T^{-1}]$	s^{-1}
84.	Resonant frequency	$\frac{1}{2\pi\sqrt{\text{Inductance} \times \text{Capacitance}}}$	$[ML^2T^{-2}A^{-2}]^{-1/2} \times [M^{-1}L^{-2}T^4A^2]^{-1/2}$	$[M^0L^0A^0T^{-1}]$	hertz (Hz)
85.	Quality factor or Q-factor of coil	$\frac{\text{Resonant frequency} \times \text{Inductance}}{\text{Resistance}}$	$\frac{[T^{-1}][ML^2T^{-2}A^{-2}]}{[ML^2T^{-3}A^{-2}]}$	$[M^0L^0T^0]$	No units
86.	Power of lens	$(\text{Focal length})^{-1}$	$[L]^{-1}$	$[M^0L^{-1}T^0]$	dioptre (D)
87.	Magnification	$\frac{\text{Size of image}}{\text{Size of object}}$	$\frac{[L]}{[L]}$	$[M^0L^0T^0]$	No units
88.	Fluid flow rate	$\frac{(\pi/8)(\text{Pressure}) \times (\text{Radius})^4}{(\text{Viscosity coefficient}) \times (\text{Length})}$	$\frac{[ML^{-1}T^{-2}][L]^4}{[ML^{-1}T^{-1}][L]}$	$[M^0L^3T^{-1}]$	$m^3\ s^{-1}$
89.	Capacitive reactance	$(\text{Angular frequency} \times \text{Capacitance})^{-1}$	$[T^{-1}]^{-1}[M^{-1}L^{-2}T^4A^2]^{-1}$	$[ML^2T^{-3}A^{-2}]$	ohm (Ω)
90.	Inductive reactance	(Angular frequency × Inductance)	$[T^{-1}][ML^2T^{-2}A^{-2}]$	$[ML^2T^{-3}A^{-2}]$	ohm (Ω)

Here it is worthy to note that constants such as $\frac{1}{2}$, π or trigonometrical functions such as $\sin\omega t$, (ratio of two sides), etc. have no units and dimensions.

There are various physical quantities which have same dimensional formula. The list of such physical quantities and corresponding dimensional formula are given below.

S. No.	Physical Quantities	Dimensional Formula
1.	Frequency, angular frequency, angular velocity, velocity gradient	$[M^0L^0T^{-1}]$
2.	Work, internal energy, potential energy, kinetic energy, torque, moment of force	$[ML^2T^{-2}]$
3.	Pressure, stress, Young's modulus, bulk modulus, modulus of rigidity, energy density	$[ML^{-1}T^{-2}]$
4.	Momentum and impulse	$[MLT^{-1}]$
5.	Acceleration, Acceleration due to gravity, gravitational field intensity	$[M^0LT^{-2}]$
6.	Thrust, force, weight, energy gradient	$[MLT^{-2}]$
7.	Angular momentum and Planck's constant (h)	$[ML^2T^{-1}]$
8.	Surface tension, force gradient, spring constant	$[ML^0T^{-2}]$
9.	Strain, refractive index, relative density, angle, solid angle, distance gradient relative permeability, relative permittivity	$[M^0L^0T^0]$
10.	If P is pressure, V is volume, m is mass, s is specific heat, L is latent heat, ΔT is rise in temperature then PV, mL, $(ms\Delta T)$ all have dimensions of energy	$[ML^2T^{-2}]$
11.	If l is length, g is acceleration due to gravity, m is mass, k is force constant, R is radius of earth, then $\left(\frac{l}{g}\right)^{1/2}, \left(\frac{m}{k}\right)^{1/2}, \left(\frac{R}{g}\right)^{1/2}$ all have the dimensions of time.	$[M^0L^0T]$
12.	If L is inductance, R is resistance, C is capacitance then L/R, CR and $\sqrt{LC}$ all have the dimensions of time.	$[M^0L^0T]$

Illustration 3

If a composite physical quantity in terms of moment of inertia I, force F, velocity v, work W and length L is defined as,

$$Q = \left(\frac{IFv^2}{WL^3}\right)$$

Find the dimensions of Q and identify it.

Soln. : As $[I] = [ML^2]$, $[F] = [MLT^{-2}]$
$[v] = [LT^{-1}]$ and $[W] = [ML^2T^{-2}]$

$$[Q] = \frac{[ML^2][MLT^{-2}][LT^{-1}]^2}{[ML^2T^{-2}][L]}$$

$\therefore$ $[Q] = [MT^{-2}]$

As $[MT^{-2}]$ are dimensions of surface tension, force constant or surface energy, i.e., energy per unit area, the physical quantity may be any one of these.

APPLICATIONS OF DIMENSIONAL ANALYSIS

(1) To check the dimensional correctness of a given physical relation.

This is based on the 'principle of homogeneity of dimensions'. According to this principle the dimensions of each term on both sides of an equation must be the same i.e., [LHS] = [RHS].

This principle is based on the fact that only quantities of same kind can be added or subtracted. For example, if we have an equation like $A = B + C$, the quantities A, B and C must have the same dimensions. A dimensionally correct equation may or may not be physically correct.

Example

(i) Consider the formula

$$S = ut - \left(\frac{1}{4}\right)at^2$$

Dimensionally, $[L] = [LT^{-1}][T] - [LT^{-2}][T^2]$

i.e., $[L] = [L] - [L]$

As in the above equation dimensions of each term on both sides are same, so this equation is dimensionally correct. However, from equations of motion we know that

$$S = ut + \left(\frac{1}{2}\right)at^2$$

So the given equation is physically wrong though it is correct dimensionally.

(ii) Consider the formula,

$$F = \frac{mv^2}{r^2}$$

Dimensionally, $[MLT^{-2}] = \frac{[M][LT^{-1}]^2}{[L]^2}$

i.e. $[MLT^{-2}] = [MT^{-2}]$

As in the above equation dimensions on both sides are not same; this formula is not correct dimensionally, so can never be correct physically.

(2) To convert a physical quantity from one system of units to the other.

This is based on the fact that magnitude of a physical quantity remains same whatever system is used for measurement *i.e.* magnitude = numerical value (n) × unit (u) = constant

or $n_1u_1 = n_2u_2$

so if a quantity is represented by $[M^aL^bT^c]$ then

$$n_2 = n_1 \frac{u_1}{u_2} = n_1\left(\frac{M_1}{M_2}\right)^a\left(\frac{L_1}{L_2}\right)^b\left(\frac{T_1}{T_2}\right)^c$$

Example

(i) Pressure is given by $P = \frac{F}{A}$

Thus dimensional formula of pressure is

$$[P] = \frac{[F]}{[A]} = \frac{[MLT^{-2}]}{[L^2]} = [ML^{-1}T^{-2}]$$