

Magnetic field due to an infinite, straight current filament	$B = \frac{\mu_0 i}{2 \pi d}$
On-axis field due to $N$ current loops and radius $r$	$B = \frac{\mu_0 i}{2 r} N$
Axial field of a finite, straight, thin shell solenoid of length $L$ and $N$ loops.	$B = \frac{\mu_0 i}{L} N$
Force for a moving charge inside a magnetic field	$\vec{F} = q \vec{v} \times \vec{B}$
Force for a straight current filament inside a magnetic field	$\vec{F} = i \cdot \vec{L} \times \vec{B}$
Magnetic force between two straight current filaments	$F = \frac{\mu_0}{2 \pi d} i_1 i_2 L$
Torque for a coil with $N$ loops	$M = i S B N \sin \alpha$
Flux through a loop	$\phi = B S \cos \alpha$
Orbit of a moving charge inside a magnetic field. Velocity is perpendicular to magnetic field.	$F_{MAG} = F_{CEN} \rightarrow q v B = m \frac{v^2}{r}$ $r = \frac{m v}{q B}, \quad T = \frac{2 \pi r}{v}, \quad f = \frac{1}{T}$

Symbol	Magnitude	S.I. unit
$B$	Magnetic field (Tesla)	$T = N \cdot A^{-1} \cdot m^{-1}$
$q$	Charge (Coulomb)	$C = A \cdot s$
$i$	Current intensity (Ampere)	$A = C \cdot s^{-1}$
$\mu_0$	Permeability of vacuum $= 4 \cdot \pi \cdot 10^{-7}$	$T \cdot m \cdot A^{-1}$
$N$	Number of loops in the coil	
$r$	Loop radius	m
$d$	Distance	m
$F$	Force	N
$v$	Velocity	$m \cdot s^{-1}$
$L$	Length	m
$S$	Section	$m^2$
$M$	Torque	$N \cdot m$
$\alpha$	Angle between magnetic field vector and velocity vector	rad <i>or</i> degrees
$m$	Mass	kg
$T$	Period	s
$f$	Frequency	Hz <i>or</i> $s^{-1}$
$\phi$	Magnetic flux (Weber)	$Wb = T \cdot m^2$