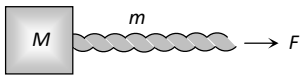
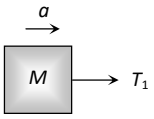
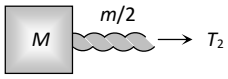
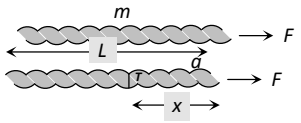
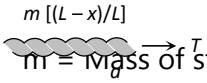
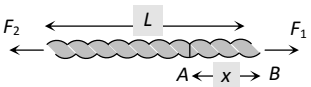
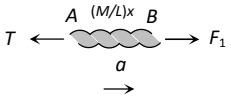
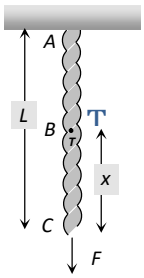
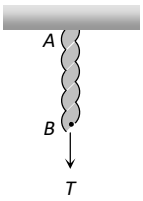
Motion of Massive String.

Condition	Free body diagram	Equation	Tension and acceleration
	 T_1 = force applied by the string on the block	$F = (M+m)a$ $T_1 = Ma$	$a = \frac{F}{M+m}$ $T_1 = M\frac{F}{(M+m)}$
	T_2 = Tension at mid point of the rope	$T_2 = \left(M + \frac{m}{2}\right)a$	$T_2 = \frac{(2M+m)}{2(M+m)}F$
		$F = ma$	$a = F/m$
 m = Mass of string T = Tension in string at a distance x from the end where the force is applied		$T = m\left(\frac{L-x}{L}\right)a$	$T = \left(\frac{L-x}{L}\right)F$
		$F_1 - T = \frac{Mxa}{L}$	$a = \frac{F_1 - F_2}{M}$

 M = Mass of uniform rod L = Length of rod		$F_1 - F_2 = Ma$	$T = F_1\left(1 - \frac{x}{L}\right) + F_2\left(\frac{x}{L}\right)$
 Mass of segment BC $= \left(\frac{M}{L}\right)x$		$T = \left(\frac{L-x}{L}\right)F$	$T = \left(\frac{L-x}{L}\right)F$