Formula and data book

Engineering v1.1

Queensland Government | QCAA Queensland Curriculum & Assessment Authority

Formulas

Statics	
$c^2 = a^2 + b^2$	$F_H = F\cos\theta$
$\sin\theta = \dfrac{\text{opposite}}{\text{hypotenuse}}$	$F_V = F\ \sin\theta$
$\cos\theta = \dfrac{\text{adjacent}}{\text{hypotenuse}}$	$F_T = \sqrt{{F_H}^2 + {F_V}^2}$
$\tan\theta = \dfrac{\text{opposite}}{\text{adjacent}}$	$\tan\theta = \dfrac{F_V}{F_H}$
$M = Fd$	$M_T = M_1 + M_2 + M_3 + \cdots$

Materials	
$\text{density} = \dfrac{\text{mass}}{\text{volume}}$	$E = \dfrac{PL}{A\Delta L} = \dfrac{\sigma}{\varepsilon}$
$\sigma = \dfrac{P}{A}$	$\text{fos} = \dfrac{\text{yield stress}}{\text{allowable working stress}}$
$\varepsilon = \dfrac{\Delta L}{L}$	$\text{UTS} = \dfrac{\text{maximum load}}{\text{original cross-sectional area}}$

Dynamics			
$F = ma$	$W = Fd$	$P = \dfrac{W}{t}$	$MA = \dfrac{F_L}{F_E}$
$VR = \dfrac{d_E}{d_L}$	$\eta = \dfrac{MA}{VR}$	$v_{av} = \dfrac{s}{t}$	$a = \dfrac{v-u}{t}$
$v = u + at$	$v^2 = u^2 + 2as$	$s = ut + \dfrac{1}{2}at^2$	$\mu_s = \tan\theta$
$F_f = \mu F_N$	$F_f = \mu_s F_N$	$F_f = \mu_k F_N$	$KE = \dfrac{1}{2}mv^2$
$PE = mgh$			

Electrical circuits		
$V = IR$	$P = VI$	$E = Pt$

Constant

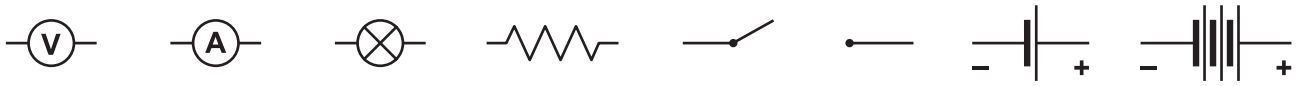
Acceleration due to gravity
$g = 9.8\ ms^{-2}$

Unit prefixes

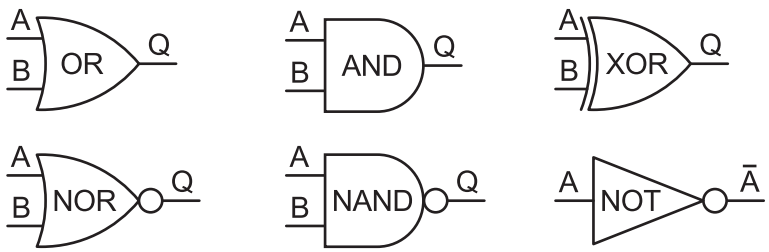
Ratio to basic unit	Prefix	Abbreviation
10^{3}	kilo	k
10^{6}	mega	M
10^{9}	giga	G
10^{12}	tera	T
10^{-1}	deci	d
10^{-2}	centi	c
10^{-3}	milli	m

Standard symbols

Electric circuits



Logic gate



Flow chart