Engineering Studies

FORMULAE SHEET

Force, Moments

$F = ma$; $M = Fd$

If a body is in equilibrium, then $\sum F_x = 0$; $\sum F_y = 0$; $\sum M = 0$

Friction

$F = \mu N$; $\mu = \tan \phi$

Energy, Work, Power

$KE = \frac{1}{2}mv^2$; $PE = mgh$; $W = Fs = \Delta PE + \Delta KE$; $P = \dfrac{W}{t}$; $P = \dfrac{Fs}{t}$; $P = Fv$

Pressure

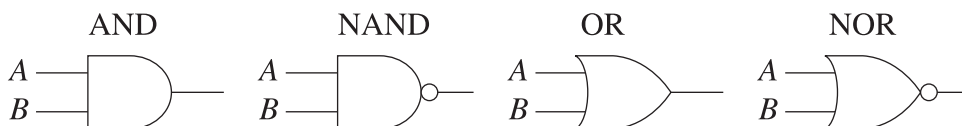$P = \dfrac{F}{A}$; $P = P_o + \rho gh$

Stress and Strain

$\sigma = \dfrac{F}{A}$; $\varepsilon = \dfrac{e}{L}$; $E = \dfrac{\sigma}{\varepsilon}$; $\sigma = \dfrac{My}{I}$

$\sigma_{\text{allowable}} = \dfrac{\sigma_{yield}}{F \text{ of } S}$ (Ductile); $\sigma_{\text{allowable}} = \dfrac{\sigma_{UTS}}{F \text{ of } S}$ (Brittle)

Machines

$MA = \dfrac{L}{E}$; $VR = \dfrac{d_E}{d_L}$; $\eta = \dfrac{MA}{VR}$

Digital Electronics

AND	NAND	OR	NOR

Electricity, Electronics

$E = IR$ $P = I^2R$

Series $R_t = R_1 + R_2 + R_3 + R_4 + \cdots + R_n$

Parallel $\dfrac{1}{R_t} = \dfrac{1}{R_1} + \dfrac{1}{R_2} + \dfrac{1}{R_3} + \dfrac{1}{R_4} + \cdots + \dfrac{1}{R_n}$