AS Formulae and Relationships to Learn (not on data sheet) v1.0

Imaging and signalling

curvature = 1/radius
lens power = 1 / focal length
information in image = number of pixels x bits per pixel
resolution of image = width of an object / number of pixels across the object
resolution of signal = p.d. range of signal / number of bits per sample
minimum sampling rate > 2 x highest frequency in signal
bit rate of signal = samples per second x bits per sample
duration of signal = number of bits in message / bit rate

Electricity

$V = IR$
$R = 1/G$
$G = I/V$
$P = E/t$
$V_1/V_2 = R_1/R_2$ in potential divider

Materials

density = mass / volume

Motion and Forces

$s = ½ (v+u) t$
$m_1v_1 = m_2v_2$ conservation of momentum
$F = ma$
$E_k = ½ mv^2$
$\Delta E_{grav} = mg\Delta h$ for constant g near surface

Waves

$\lambda_{fundamental} = 4L$ for pipe with closed end
$\lambda_{fundamental} = 2L$ for pipe with open ends
$\lambda_{fundamental} = 2L$ for string
n = c in vacuum / c in material
$n\lambda = dx/L$
maximum $n = d/\lambda$ ($\sin 90 = 1$)

Atomic and nuclear physics

$E = hc/\lambda$ for photon
$\lambda = h/mv$ for electron
$E_k(max) = hf - \phi$ in photoelectric effect

angle ≈ short side / long side