Useful Formulae and Constants

Refraction

$$v = \frac{c}{n}$$

$$l_n = \frac{l}{n}$$

$$n_1 \sin\theta_1 = n_2 \sin\theta_2$$

$$\sin q_c = \frac{n_2}{n_1}$$

Mirror and Lens

$$f = r/2$$

$$\frac{1}{d_o} + \frac{1}{d_i} = \frac{1}{f}$$

$$m = \frac{h_i}{h_o} = -\frac{d_i}{d_o}$$

$$\frac{1}{f} = (n-1)\left(\frac{1}{R_1} + \frac{1}{R_2}\right)$$

$$P = \frac{1}{f}$$

$$\text{f - stop} = \frac{f}{D}$$

$$\text{E}xposure = \frac{\text{shutter speed}}{(f - stop)^2}$$

$$M = -\frac{f_o}{f_e}$$

$$M \approx \left(\frac{N}{f_e}\right)\left(\frac{l}{f_o}\right)$$

Interference and Diffraction

$$d \sin\theta = m\lambda$$

$$d \sin q = \left(m + \frac{1}{2}\right) l$$

$$q = \frac{1.22\,l}{D}$$

Polarization

$$I = I_0 \cos^2\theta$$

$$\tan q_p = \frac{n_2}{n_1}$$

$$q_p + q_r = 90^0$$