Physics Formula Sheet

Chapter by chapter, topic by topic. Written by the PadhoNa team for quick revision.

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CHAPTER 27

Wave Optics

Interference (YDSE)

FRINGE WIDTH

$$\beta = \frac{\lambda D}{d}$$

PATH DIFFERENCE

$$\Delta x = \frac{yd}{D}; \qquad \text{bright: } \Delta x = n\lambda; \qquad \text{dark: } \Delta x = (2n-1)\frac{\lambda}{2}$$

INTENSITY

$$I = I_1 + I_2 + 2\sqrt{I_1 I_2}\cos\phi; \qquad \frac{I_{\max}}{I_{\min}} = \left(\frac{\sqrt{I_1}+\sqrt{I_2}}{\sqrt{I_1}-\sqrt{I_2}}\right)^2$$

THIN SLAB IN ONE PATH

$$\text{shift} = \frac{(n-1)tD}{d}$$

IN A MEDIUM

$$\beta' = \frac{\beta}{n}$$

Diffraction

SINGLE SLIT MINIMA

$$a\sin\theta = n\lambda; \qquad \text{central maximum width} = \frac{2\lambda D}{a}$$

RESOLVING POWER

$$\theta_{\min} = \frac{1.22\lambda}{D}\ (\text{telescope})$$

FRESNEL DISTANCE

$$z_F = \frac{a^2}{\lambda}$$

Polarisation

MALUS'S LAW

$$I = I_0 \cos^2\theta; \qquad \text{unpolarised through a polaroid: } \frac{I_0}{2}$$

BREWSTER'S LAW

$$\tan\theta_B = n; \qquad \theta_B + r = 90^\circ$$

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