

General Physics IIA — Equation Sheet

Ch. 22 Induction — Ch. 24 Electromagnetic Waves — Ch. 25 Mirrors — Ch. 26 Lenses

Magnetic Flux

$$\Phi_B = BA \cos \theta$$

Faraday's Law

$$\mathcal{E} = -N \frac{\Delta \Phi_B}{\Delta t}$$

Magnitude Form

$$|\mathcal{E}| = N \frac{|\Delta \Phi_B|}{\Delta t}$$

Lenz's Law

Induced current opposes the change in magnetic flux.

Motional emf

$$\mathcal{E} = B\ell v$$

Wave Speed Relation

$$v = f\lambda$$

For light in vacuum

$$c = f\lambda$$

Index of Refraction

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

Mirror/Thin Lens Equation

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

Magnification

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

- f = focal length
- d_o = object distance
- d_i = image distance
- h_o = object height
- h_i = image height

Spherical Mirrors

$$f = \frac{R}{2}$$

Sign Conventions

- Converging: $f > 0$
- Diverging: $f < 0$
- Real image: $d_i > 0$
- Virtual image: $d_i < 0$
- Upright image: $m > 0$
- Inverted image: $m < 0$

Plane Mirror

$$d_i = -d_o$$

$$h_i = h_o$$

$$m = +1$$

Lens Power

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

- P in diopters if f is in meters

Refraction

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