Physics Formula Sheet

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

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CHAPTER 24

Alternating Current

AC circuits and impedance

RMS VALUES

$$I_{\text{rms}} = \frac{I_0}{\sqrt{2}}, \qquad V_{\text{rms}} = \frac{V_0}{\sqrt{2}}; \qquad \text{average over half cycle } \frac{2I_0}{\pi}$$

REACTANCES

$$X_L = \omega L, \qquad X_C = \frac{1}{\omega C}$$

SERIES LCR

$$Z = \sqrt{R^2 + (X_L - X_C)^2}, \qquad \tan\phi = \frac{X_L - X_C}{R}$$

Resonance, power and power factor

RESONANCE

$$\omega_0 = \frac{1}{\sqrt{LC}}, \qquad Z = R, \qquad Q = \frac{\omega_0 L}{R} = \frac{1}{R}\sqrt{\frac{L}{C}}$$

POWER

$$P = V_{\text{rms}} I_{\text{rms}} \cos\phi, \qquad \cos\phi = \frac{R}{Z}$$

BANDWIDTH

$$\Delta\omega = \frac{R}{L}$$

Transformers and LC oscillations

TRANSFORMER

$$\frac{V_s}{V_p} = \frac{N_s}{N_p} = \frac{I_p}{I_s} \text{ (ideal)}$$

LC OSCILLATIONS

$$q = q_0 \cos \omega t, \qquad \omega = \frac{1}{\sqrt{LC}}, \qquad \frac{q_0^2}{2C} = \tfrac{1}{2} L I_0^2$$

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