

AP Physics Cheat Sheet*

Mechanics

$$v = \frac{2\pi r}{T}$$

$$a_c = \frac{4\pi^2 r}{T^2}$$

$$v_{\text{escape}} = \sqrt{\frac{2Gm_1}{r_i}}$$

Electricity

$$E_{\text{sheet}} = \frac{\sigma}{2\epsilon_0}$$

$$E_{\text{rod}} = \frac{\lambda}{2\pi\epsilon_0 r}$$

Magnetism

$$B = \frac{\mu_0}{4\pi} \frac{qv}{r^2} \sin \theta$$

$$B_{\text{int}} = \frac{\mu_0 I}{2\pi r}$$

$$\mathcal{E}_{\text{motion}} = B\ell v$$

$$L = \frac{N\Phi}{I}$$

RC circuit (charging)

$$\tau = RC$$

$$V = V_f (1 - e^{-t/\tau})$$

$$Q = Q_f (1 - e^{-t/\tau})$$

$$I = I_i e^{-t/\tau}$$

RL circuit (closing switch)

$$\tau = \frac{L}{R}$$

$$V = V_i e^{-t/\tau}$$

$$I = I_f (1 - e^{-t/\tau})$$

LC circuit

$$\omega = \frac{1}{\sqrt{LC}}$$

$$Q = Q_i \cos(\omega t)$$

$$T = 2\pi\sqrt{LC}$$

Units

$$N = \text{kg m/s}^2$$

$$J = \text{N m} = \text{kg m}^2/\text{s}^2$$

$$W = J/\text{s} = \text{kg m}^2/\text{s}^3$$

$$C = \text{A s}$$

$$A = \text{C/s}$$

$$V = J/C = \text{kg m}^2 \text{s}^{-3} \text{A}^{-1}$$

$$\Omega = V/A = \text{kg m}^2 \text{s}^{-3} \text{A}^{-2}$$

$$F = C/V = \text{s}^4 \text{A}^2 \text{m}^{-2} \text{kg}^{-1}$$

$$T = \text{N/A/m} = \text{kg s}^{-2} \text{A}^{-1}$$

$$\text{Wb} = \text{T m}^2 = \text{kg m}^2 \text{s}^{-2} \text{A}^{-1}$$

$$H = \text{Wb/A} = \text{kg m}^2 \text{s}^{-2} \text{A}^{-2}$$

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