Physics Formula Sheet

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

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CHAPTER 7

Work Power Energy

Work and energy

WORK

$$W = \vec{F} \cdot \vec{s} = Fs\cos\theta, \qquad W = \int \vec{F} \cdot d\vec{r}$$

WORK–ENERGY THEOREM

$$W_{\text{net}} = \Delta K = \tfrac{1}{2}mv^2 - \tfrac{1}{2}mu^2$$

POTENTIAL ENERGY

$$F = -\frac{dU}{dx}; \qquad U = mgh; \qquad U_{\text{spring}} = \tfrac{1}{2}kx^2$$

KINETIC ENERGY AND MOMENTUM

$$K = \frac{p^2}{2m}$$

EQUILIBRIUM

$$\frac{dU}{dx} = 0; \qquad \frac{d^2U}{dx^2} > 0 \text{ stable}, \ < 0 \text{ unstable}$$

Power

$$P = \frac{dW}{dt} = \vec{F} \cdot \vec{v}, \qquad \eta = \frac{\text{output}}{\text{input}}$$

Vertical circular motion

STRING

$$v_{\text{bottom}} \geq \sqrt{5gl}, \qquad v_{\text{top}} \geq \sqrt{gl}, \qquad T_{\text{bottom}} - T_{\text{top}} = 6mg$$

ROD (RIGID)

$$v_{\text{bottom}} \geq \sqrt{4gl}$$

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