Physics Formula Sheet

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

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CHAPTER 6

Circular Motion

Kinematics of circular motion

$$v = \omega r, \qquad a_c = \frac{v^2}{r} = \omega^2 r, \qquad a_t = \alpha r, \qquad a = \sqrt{a_c^2 + a_t^2}$$

$$\omega = \frac{2\pi}{T} = 2\pi n, \qquad \omega = \omega_0 + \alpha t, \;\; \theta = \omega_0 t + \tfrac{1}{2}\alpha t^2$$

Dynamics and banking of roads

CENTRIPETAL FORCE

$$F = \frac{mv^2}{r}$$

FLAT ROAD

$$v_{\max} = \sqrt{\mu r g}$$

BANKED ROAD

$$\tan\theta = \frac{v^2}{rg}\ (\text{no friction}); \qquad v_{\max} = \sqrt{rg\,\frac{\mu + \tan\theta}{1 - \mu\tan\theta}}$$

CONICAL PENDULUM

$$\tan\theta = \frac{v^2}{rg}, \qquad T = 2\pi\sqrt{\frac{L\cos\theta}{g}}$$

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