Torque and Rotational Dynamics

AP Physics 1 · Vocabulary in context

Word	Example
rigid system	A **rigid system** keeps its shape.
angular displacement /ˈæŋgjʊlə dɪˈspleɪsmənt/	After a quarter turn, the **angular displacement** is 90°. 90°
radians /ˈreɪdɪənz/	Half a turn is π **radians**. π
angular velocity /ˈæŋgjʊlə vəˈlɒsɪti/	The wheel turns with an **angular velocity** of 3 rad/s. 3 rad/s
angular acceleration /ˈæŋgjʊlə əkˌseləˈreɪʃn/	A wheel that spins faster and faster has an **angular acceleration**.
rotational kinematic equations	The **rotational kinematic equations** use angle instead of distance.
axis of rotation	The wheel spins about its **axis of rotation**.
Torque /tɔːk/	**Torque** is a turning force.
moment arm /ˈməʊmənt ɑːm/	Measure the **moment arm** perpendicular to the force's line.
line of action /laɪn ɒv ˈækʃn/	The **line of action** of the weight passes through the centre of gravity.
clockwise /ˈklɒkwaɪz/	The hands of a clock turn **clockwise**.
counterclockwise	The wheel turns **counterclockwise**.
static friction /ˈstætɪk ˈfrɪkʃn/	**Static friction** lets a wheel roll without sliding.

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Rotational inertia /rəʊˈteɪʃənl ɪˈnɜːʃə/	**Rotational inertia** resists changes in spin.
moment of inertia /ˈməʊmənt ɒv ɪˈnɜːʃə/	The **moment of inertia** depends on how mass is spread.
• **point mass** /pɔɪnt mæs/	Treat the planet as a **point mass** at its centre.
hoop /huːp/	A **hoop** has all its mass at the edge.
solid disk	A **solid disk** has mass spread across it.
rotational equilibrium /rəʊˈteɪʃənl ˌiːkwɪˈlɪbrɪəm/	A balanced see-saw is in **rotational equilibrium**.
net torque /net tɔːk/	The **net torque** causes angular acceleration.
pivot /ˈpɪvət/	The see-saw turns about its **pivot**.
translation /trænˈsleɪʃn/	In **translation**, every part of the object moves the same way.
tension /ˈtenʃn/	The **tension** in the rope holds up the lamp.
uniform /ˈjuːnɪfɔːm/	The rod is **uniform**: its mass is spread evenly.
force diagram	Draw a **force diagram** for the beam.
revolutions	The wheel made ten **revolutions**.
analogues	Torque and force are **analogues**: they play the same role.