



Science Virtual Learning

MPI Physics

Rotational Dynamics 1: Torque

April 16, 2020



Lesson: MPI Rotational Kinematics 8
Homework for Mastery
April 16, 2020

Objective: To practice solving rotational kinematics problems

There is no lesson this time, just 4 homework problems for you to work on. Try solving them yourself, and if you get stuck, watch the solution video for each.

Rotational Motion HW




Homework 1

25. ssm The wheels of a bicycle have an angular velocity of $+20.0 \text{ rad/s}$. Then, the brakes are applied. In coming to rest, each wheel makes an angular displacement of $+15.92$ revolutions. **(a)** How much time does it take for the bike to come to rest? **(b)** What is the angular acceleration (in rad/s^2) of each wheel?


- Try to solve the problem yourself, then watch the solution video:
- <https://youtu.be/QHOSFphmj2I>

Homework 2

*28.  A top is a toy that is made to spin on its pointed end by pulling on a string wrapped around the body of the top. The string has a length of 64 cm and is wound around the top at a spot where its radius is 2.0 cm. The thickness of the string is negligible. The top is initially at rest. Someone pulls the free end of the string, thereby unwinding it and giving the top an angular acceleration of $+12 \text{ rad/s}^2$. What is the final angular velocity of the top when the string is completely unwound?


- Try to solve the problem yourself, then watch the solution video:
- <https://youtu.be/EwbUYwTVFho>

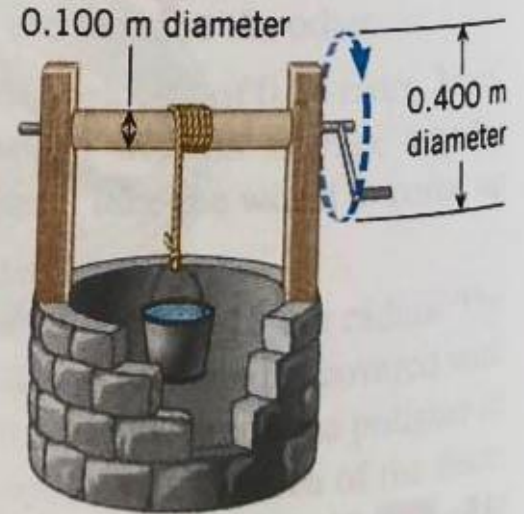
Homework 3

38.  In 9.5 s a fisherman winds 2.6 m of fishing line onto a reel whose radius is 3.0 cm (assumed to be constant as an approximation). The line is being reeled in at a constant speed. Determine the angular speed of the reel.

- Try to solve the problem yourself, then watch the solution video:
- <https://youtu.be/EABUSXsCUZc>

Homework 4

***42.**  A person lowers a bucket into a well by turning the hand crank, as the drawing illustrates. The crank handle moves with a constant tangential speed of 1.20 m/s on its circular path. The rope holding the bucket unwinds without slipping on the barrel of the crank. Find the linear speed with which the bucket moves down the well.



***43.** A thin rod (length = 1.50 m) is

- Try to solve the problem yourself, then watch the solution video:
- <https://youtu.be/Lx5JSq3518I>



That's it!

