

## Chapter 9 Rotation of a Rigid Body

### Example 1:

A wheel goes from rest to 500 RPM in 2 seconds. Through what angle does the wheel rotate while getting up to speed?

### Example 2:

A car goes from 0 to 60 mph in 8 seconds. If its tires have a 1.2 ft radius, what is the tire's angular acceleration?

### Example 3:

What is the rotational kinetic energy of a cylinder rotating about its center? The cylinder has a mass of 2.3 kg, a radius of 0.75 m and an angular speed of 60 rpm.

### Example 4:

Use the parallel-axis theorem to calculate the rotational inertia of a solid sphere if it rotates about a point on its surface.

### Example 5:

How much energy would be released if the earth stopped rotating? (Earth's mass is  $5.98 \times 10^{24}$  kg and its radius is  $6.37 \times 10^6$  m.)

### Example 6:

A cord is wrapped around a horizontal cylinder ( $R = 5$  cm and  $M = 4$  kg). A 14 kg bucket hangs from the cord's loose end. What is the speed of a point on the edge of the cylinder after the bucket falls 1.25 m? (Assume the bucket starts from rest.)

### Example 7:

An 8 kg block rests on smooth horizontal tabletop. It is attached to a 15 kg block which hangs over a pulley at the edge of the table. The pulley is shaped like a hoop with a radius of 5 cm and a mass of 2 kg. What is the speed of the 15 kg block after it falls 2.5 m if it starts from rest?