

Practice Problem Set

Not to be turned in for credit!

Question 1 (1 point)

Imagine that you are riding a bicycle facing due east, and travelling forwards. In what direction do the angular momenta of the bicycle wheels spinning around their axles point?

Question 2 (3 points)

A tetherball of mass 0.35 kg is travelling with a velocity of 1.2 m/s north, 2.4 m/s east and 0.6 m/s up. The tetherball is connected to a post, and the ball is 0.6 m north and 0.8 m west and 0.1 m below the point at which the rope is attached to the post. What is the angular momentum of the ball with respect to the point at which the rope is attached to the post?

Question 3 (3 points)

What are the average angular momenta of the following planets in their orbits around the sun: Venus, Mars, and Jupiter? The relevant planetary data can be found at:

<http://en.wikipedia.org/wiki/Venus>

<http://en.wikipedia.org/wiki/Mars>

<http://en.wikipedia.org/wiki/Jupiter>

You can assume that the orbits are circular and the radii of the circles are equal to the semi-major axes of the orbits. In what direction do all of these planetary angular momenta point?

Question 4 (3 points)

The sun rotates around its axis once every 25 earth-days. Assume that the sun's mass is evenly distributed throughout its volume. If the sun were to suddenly collapse into a neutron star so that it had a new radius which was only 0.025% of its original radius (but still had its mass evenly distributed throughout its volume) what would the new period of its rotation be?