

## PHYSICS 5A – HOMEWORK SET 8

Due Wednesday, 11/13/02. Ten points per problem. Answers to the odd-numbered exercises are in the back of the book.

Reading: Young and Freedman Chapter 10

1.) Problem 10.3

2.) Problem 10.15

3.) Problem 10.16

4.) First, consider a point-like object of mass  $m$  moving by an a point  $O$ , whose distance from the point  $O$  is  $s$ , and whose velocity  $\vec{v}$  is perpendicular to the line of length  $s$  between the point  $O$  and and the object. Second, consider the same object after it has moved a distance  $d$  further along its path, assuming that it's not under the influence of any external force (i.e., asuming it's travelling along a straight line with constant speed  $v$ ). Show that, in both cases, the angular momentum  $\vec{L} = \vec{r} \times \vec{p}$  has the same magnitude and direction, i.e., that angular momentum is conserved about the axis through point  $O$  for an object moving freely through space.

5.) Problem 10.36 (Answer: 0.924 rad/s)

6.) Problem 10.64 (Some answers: a)  $\sqrt{20hy/7}$ ; d)  $\sqrt{8hy/3}$ )

7.) Problem 10.73

8.) Problem 10.75