Name (print): _____

Section _____ Table _____ Group _____

Honor Code: *I have neither given nor received unauthorized aid on this test*

Signature: _____

ME 201 Sample Test 4

April 2007

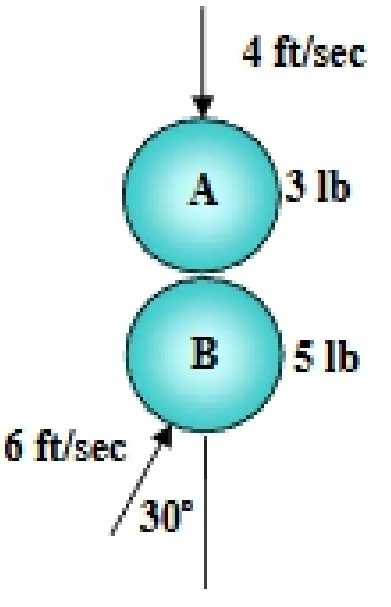
NOTES:

- ***Sign and provide identifying info on every sheet.***
- *Use proper* ***vector notation*** *in all cases where vectors are used.*
- *In cases involving Newton's Laws, you are* ***REQUIRED to draw*** *complete and correct* ***FBDs*** *and when the problem is dynamics, you must also draw complete and correct* ***KDs****. Then use these to develop your governing equations.*
- *In cases involving work-energy or impulse-momentum, you need to draw* ***diagrams appropriate to those methods****, labeling positions or times clearly, so you will have success and so we can follow your work.*
- *If you use you* ***calculator to perform any calculus*** *that might involve trig or similar functions, set your calculator to the* ***radian mode*** *first.*
- *In all cases, remember to show results with* ***magnitude, direction, units*** *and put your* ***answer in a box****.*

ME 201 **Test #5** **Fall 2006** Name (print): _____

Section _____ Table _____ Group _____

1. (30 pts) Two spheres are translating with the velocities shown immediately before they collide. The weights are shown. The coefficient of restitution between the two materials is 0.60. The contact surfaces may be considered to be frictionless. Find the velocity vectors of each sphere immediately after the impact is complete. Find the percentage of loss in kinetic energy due to the impact.



ME 201 **Test #5** **Fall 2006** Name (print): _____

Section _____ Table _____ Group _____

2. (30 pts) The system rotates in a vertical plane and is at rest in the vertical position when $\theta = 90°$. The 12-lb nonuniform bar OA has a center of gravity at G as shown and a 6-in radius of gyration about an axis at G perpendicular to the plane of motion. The pin bearing at O is frictionless. The linear spring is unstretched in the initial at rest position ($\theta = 90°$). The spring has a stiffness of 3 lb/in, or 36 lb/ft. A constant couple M is applied to cause the system to rotate clockwise. Find the magnitude of M such that when the bar is horizontal ($\theta = 0°$) the angular speed will be 4 rad/sec.