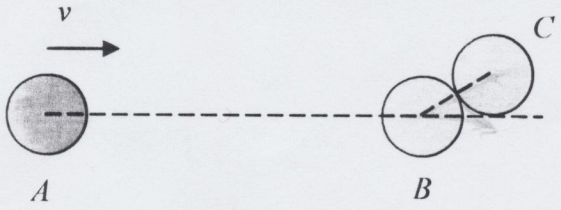
Department of Mechanical Engineering
University of California at Berkeley
ME 104 Engineering Mechanics II
Spring Semester 2012

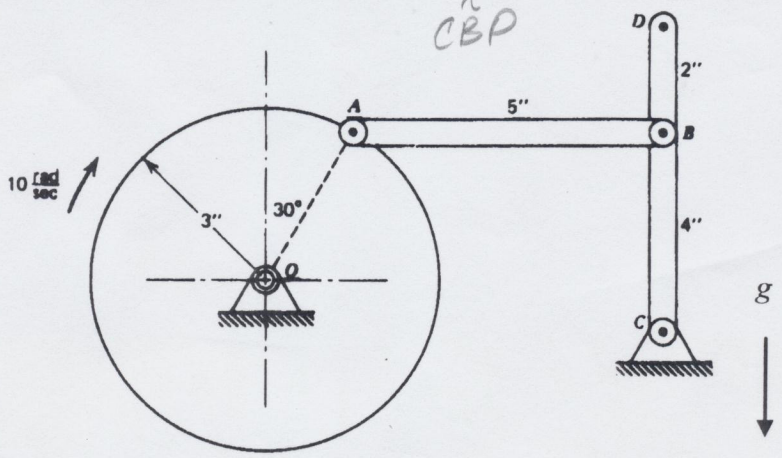
Instructor: F. Ma
Midterm Examination No. 2 Mar 21, 2012

The examination has a duration of 50 minutes.
Answer all questions.
All questions carry the same weight.

1. Three same-size spheres are placed on a smooth horizontal surface. Sphere A has a mass $2m$ while spheres B and C each has mass m. Spheres A and B are placed along the same center line. Sphere C is placed next to B with an offset of distance r, which is the radius of the sphere. The coefficient of restitution between each sphere is e. If sphere A has a speed v just before a direct collision with B, determine the speed of each sphere after the collision.



2. The circular disk rotates about O with a constant angular velocity of 10 rad/s. When OA is 30° from the vertical as shown, link AB is horizontal and arm CBD is vertical. For this instant determine the angular velocity of the arm and the velocity of point D.



3. The wheel rolls on the circular surface without slipping. In the bottom position, it has an angular velocity ω and an angular acceleration α, both clockwise. Determine the acceleration of the point A for the position shown.