Name _____ Section _____

ES204
Examination II
January 21, 2005

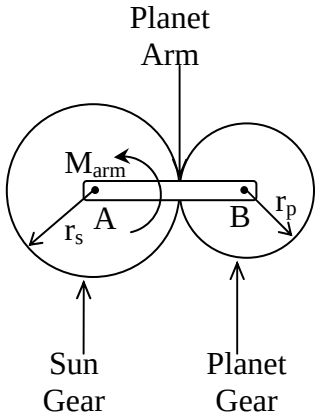
Problem	Score
1	/30
2	/35
3	/35
Total	/100

Show all work for credit
AND
Turn in your signed help sheet
AND
Stay in your seat until the end of class

Name _____ 30 pts

ES204 Examination II **Problem 1** Jan. 22, 2004

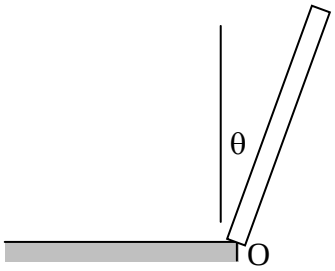
For the *planetary gear set* shown at right, the **sun gear is fixed** and the planet arm has an applied moment. The system is initially at rest and the gears do not slip. The arm can be treated as a slender rod and the gears as solid disks. Assume all the masses are known. What is the angular velocity of the planet gear when the arm has rotated 90° counterclockwise? Set up but do not solve your equations. Show all your work for full credit.



Name _____ 35 pts

ES204 Examination II **Problem 2** Jan. 21, 2005

A uniform slender rod of mass and length L is released from rest in the vertical position and pivots on its end about the corner at O. If the bar is observed to slip when $\theta = 30°$ find the coefficient of friction μ_s between the bar and the corner. Do not actually solve for μ_s, just derive the necessary equations.



Name _____ 35 pts

ES204 Examination II **Problem 3** Jan. 21, 2005

A frozen fruit can rests on the horizontal rack of a freezer door as shown. With what maximum angular velocity ω_{door} can the door be "slammed" shut against it's seal and not dislodge the can, that is, so the can does not roll over the rack? Assume the can rolls without slipping on the corner of the rack, and neglect the distance d compared with the 500-mm distance. Set up don't solve.