

Paper HW 9: Torque

Two identical spheres of radius r are placed inside a cylinder of radius R as shown in the diagram below. You are given that $R/2 < r < R$ and that each ball has a weight W . All surfaces are smooth. Show that there is a minimum mass, m , of the cylinder which will allow it to remain upright (for smaller cylinder masses, the cylinder tips over. Show that this mass is given by

$$m = (2W/g)(1-r/R).$$

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