A uniform rod of mass M and length L is held flat on a horizontal table and at right angles to an edge of the table. The center of mass C of the rod projects a distance d beyond the table edge at A. The rod is released at rest. It starts to rotate about A and eventually slides off the table. The coefficient of static friction is μ.

(a) Calculate the moments of inertia of the rod, I_C about point C and I_A about point A. You may express the answers for parts (b)-(d) below in terms of I_C and I_A.

(b) Calculate the angular velocity ω of the rod as a function of the rotation angle θ before sliding occurs.

(c) The force exerted by the table edge on the rod has a component N in a direction perpendicular to the rod and the table edge. Calculate N as a function of θ before sliding occurs.

(d) Calculate the angle θ_0 when sliding begins.