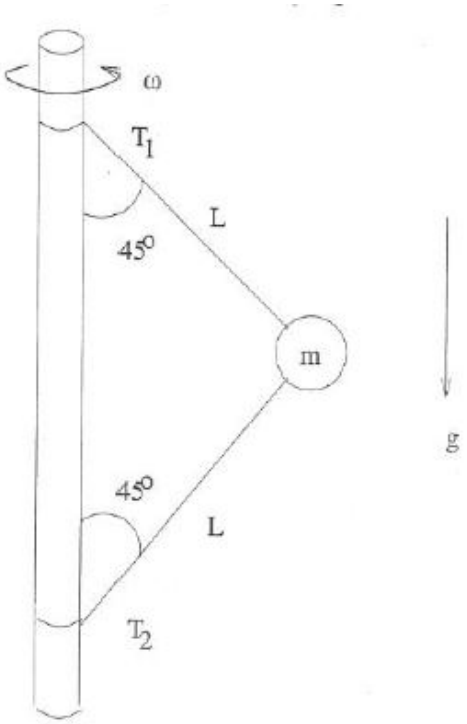
QP28

A mass m is connected to a vertical revolving axle by two massless strings of length l, each making an angle of 45° with the axle as shown. Both the axle and mass are revolving with large angular velocity ω. You may neglect the radius of the axle.



a) (1 point) Draw a free body diagram for the forces acting on the mass m.

b) (2 points) Find the tensions T_1 and T_2 in the two strings. Give your answer in terms of ω, m, L, and g.

c) (1 point) What is the minimum angular velocity ω_{min} such that both strings remain taut? Give your answer in terms of m, L, and g.