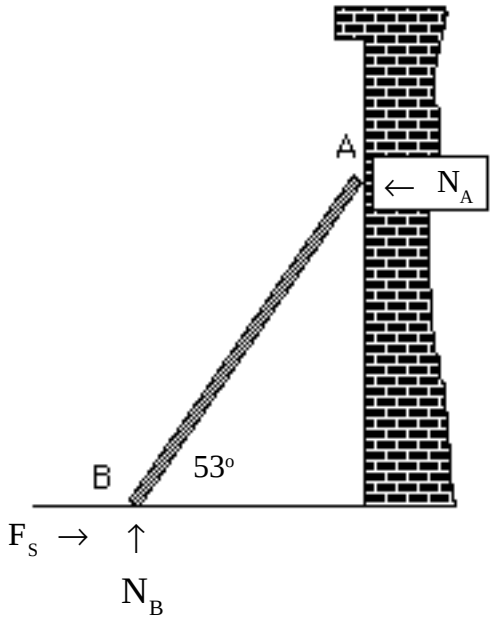
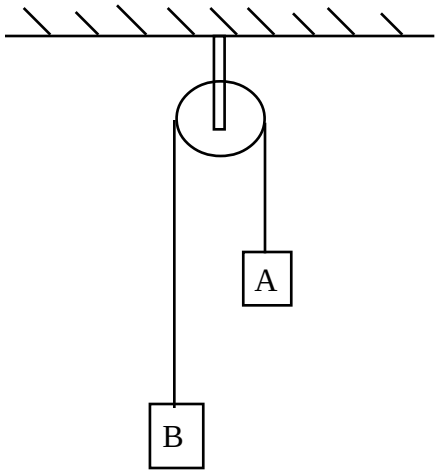
ROTATIONAL DYNAMICS – QUIZ 1.0H

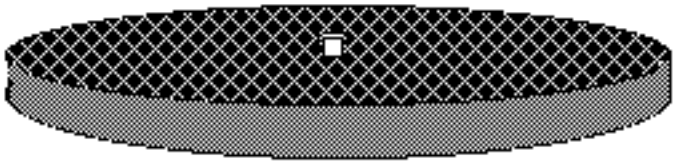
1. A ladder with mass 15kg leans against a frictionless wall. The length of the ladder is 10m and it makes a 53^0 with the ground. (a)With no one on the ladder determine the normal forces at pts A and B and the static friction force at pt B. (b)Suppose a 60kg physics student climbs 3/4 of the way up the ladder and the ladder just slips. Find the static coefficient of friction.



2. This time the pulley has a mass of M = 8kg and a radius of 10cm. Assume it is a solid disk and use $I = \frac{1}{2}MR^2$. The two hanging masses have m_A= 5kg and m_B = 3kg. Find the tension on each side of the pulley and the magnitude of the acceleration of each block.



3. A huge turntable with m_A = 60kg and radius, R_A = 3m is rotating counterclockwise at a rate of ω_{AO} = 5 Rad/s. A rather large record with m_B = 12kg and radius, R_B = 2m is dropped on the turntable. The record has no initial angular velocity, ω_{BO} = 0 Rad/s. Soon both A and B are turning at the same rate. Find that final angular velocity. Consider both objects to be solid disks and use $I = \frac{1}{2}MR^2$



4. A <u>hollow</u> sphere ($I = \frac{2}{3}MR^2$) is at rest as shown when a slight breeze just starts the ball rolling. Assume the ball rolls with no slipping from pt A to pt B. Use energy methods to determine the speed of the ball's center of mass at pt B. The mass of the ball is M = 5kg and its radius is R = 2m. The height of pt A above pt B is h = 3m.