Rotation Problems

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1 Problems

1. A solid disk of mass M and radius R acts as a pulley. On one end of the pulley is a block of mass m_1, and on the other end of the pulley is a block of mass m_2. What is the acceleration of each block? What is the angular acceleration of the disk?

2. A solid sphere ($I = \frac{2}{5}MR^2$) has a radius R and mass M. It is allowed to roll down an incline at an angle θ. What is the velocity of the sphere after a time t? What is the rotational speed of the sphere after the same time? The sphere does not slip, and do not neglect friction.

3. A rod of mass m and length L is attached to a pivot. It is then nudged. What is the period of oscillation for small angles?