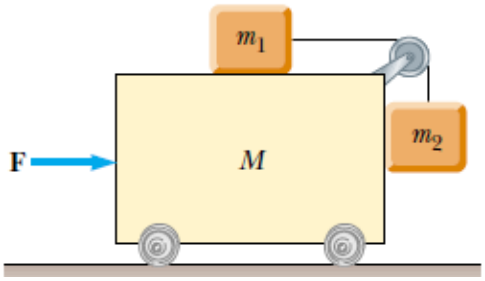
HOMEWORK-2

Deadline: 4-8 November 2013

1. What horizontal force must be applied to the cart shown in Figure 1 in order that the blocks remain stationary relative to the cart? Assume all surfaces, wheels, and pulley are frictionless. (Hint: Note that the force exerted by the string accelerates m_1.)



Şekil 1

2. Initially the system of objects shown in Figure 1 is held motionless. All surfaces, pulley, and wheels are frictionless. Let the force ***F*** be zero and assume that m_2 can move only vertically. At the instant after the system of objects is released, find:

a) The tension T in the string,

b) The acceleration of m_2,

c) The acceleration of M,

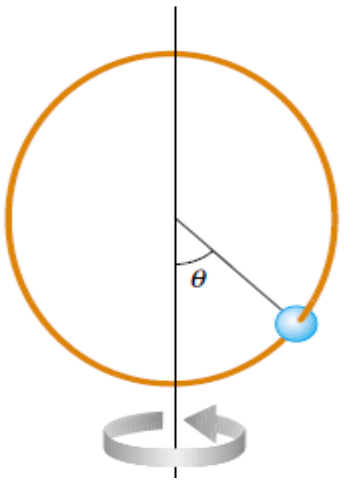
d) The acceleration of m_1.

(Note: The pulley accelerates along with the cart.)

3. A single bead can slide with negligible friction on a wire that is bent into a circular loop of radius 15,0 cm, as in Figure 2. The circle is always in a vertical plane and rotates steadily about its vertical diameter with a period of 0,450 s. The position of the bead is described by the angle θ that the radial line, from the center of the loop to the bead, makes with the vertical.

a) At what angle up from the bottom of the circle can the bead stay motionless relative to the turning circle?

b) What if? Repeat the problem if the period of the circle's rotation is 0,850 s.



Şekil 2