

## Homework of chapter 2

Date:

Name:

Student ID:

1、 The bob of a 2-m pendulum describes an arc of circle in a vertical plane. If the tension in the cord is 2.5 times the weight of the bob for the position shown, find the velocity and the acceleration of the bob in that position.

2、 The two blocks shown are originally at rest. Neglecting the masses of the pulleys and the effect of the friction in the pulleys and between block A and the incline, determine (a) the acceleration of each block, (b) the tension in the cable.

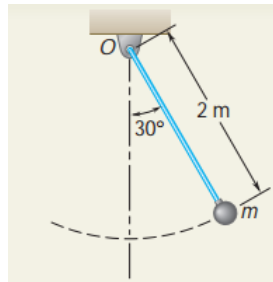


Fig.1

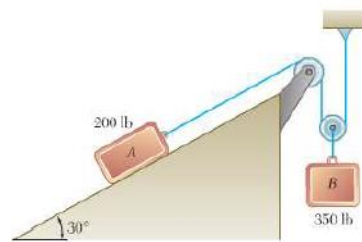


Fig.2

3、 A particle of mass  $m$  is projected from point A with an initial velocity  $v_0$  perpendicular to line OA and moves under a central force  $F$  along a semicircular path of diameter OA. Observing that  $r = r_0 \cos \theta$ , show that the speed of the particle is  $v = v_0 / \cos^2 \theta$ .

4、 A small 250-g collar C can slide on a semicircular rod which is made to rotate about the vertical AB at a constant rate of 7.5 rad/s. Knowing that the coefficients of friction are  $\mu_s = 0.25$  and  $\mu_k = 0.20$ , indicate whether the collar will slide on the rod if it is released in the position corresponding to (a)  $\theta = 75^\circ$ , (b)  $\theta = 40^\circ$ . Also, determine the magnitude and direction of the friction force exerted on the collar immediately after release.

( $\mu_s$  : static friction coefficient;  $\mu_k$ : coefficient of kinetic friction)

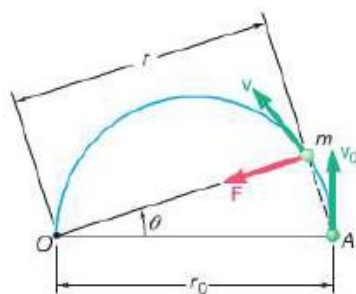


Fig.3

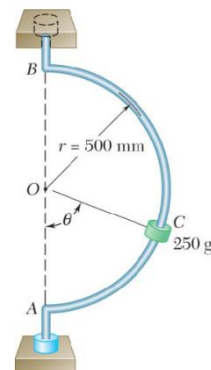


Fig.4