Physics 131
Midterm II

(11:30-12:18pm)

(No paper or calculator allowed. Explain your work to receive full credit: 100 points)

(Assume g = 10 m/s^2, $\sin 30^0 = \frac{1}{2}, \cos 30^0 = \frac{\sqrt{3}}{2}, \sin 37^0 = \frac{3}{5}, p = 3.1$)

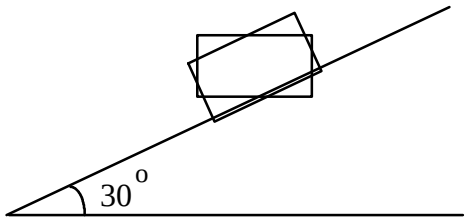
($x = x_0 + v_0 t + \frac{1}{2} a t^2 \quad v = v_0 + at \quad v^2 = v_0^2 + 2a(x - x_0) \quad W = \frac{1}{2} k x^2$)

Name: _____ Page: ___1_____

Rec. Instr.: _____

1. A block is placed on an incline as shown.

(a) If the coefficient of kinetic friction between the block and the incline is $1/\sqrt{12}$, what is the acceleration of the block? (15 pts)

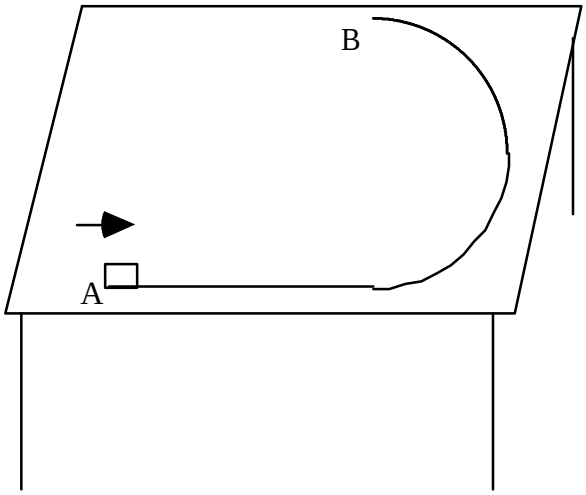


(b) How long does it take for the block to reach a speed of 5 m/s?
(10pts)

Rec. Instr.: _____

2. A 1 kg block is shot with a speed of 1 m/s into a hook attached to a frictionless table as shown. The length of the straight section is 2 m and the radius of the hook is 1 m. The surface of the hook is frictionless.

(a) Name the type of physical force that provides the centripetal force to keep the block moving in the circular path. (5 pts)



(b) What is the magnitude and direction of the force?
(10pts)

(c) What is the total time it takes for the block to go from one end (point A) of the hook to the other (point B)? (5 pts)

(d) What is the direction of block when it exits from the end of the hook? (5 pts)

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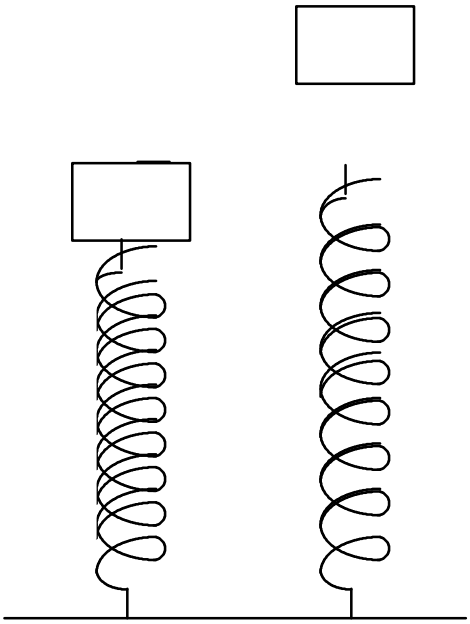
Rec. Instr.: _____

3. A student measures the spring constant of a spring by compressing the spring 10 cm with a 1 kg block. She then releases it. The block rises above the compressed position by 20 cm before falling back down.

(a) What is the spring constant of the spring?

(15pts)



(b) How much is the spring compressed after the block comes to rest again?

(10pts)

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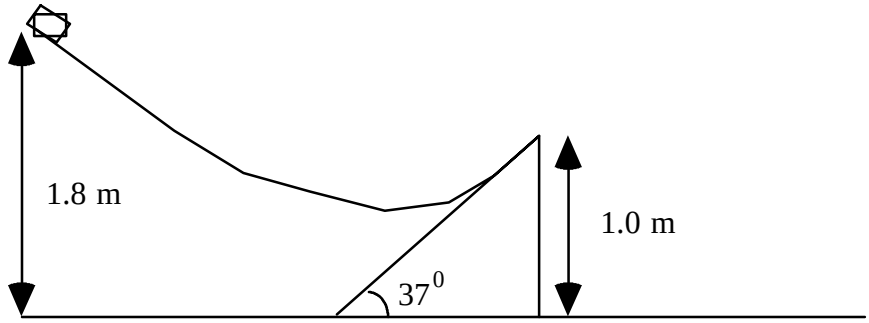
Rec. Instr.: _____

4. A kid slides down a ice covered ramp as shown. He initially starts from a height of 1.8 m with a speed of 3 m/s.

(a) What is the speed of the kid when he flies off the ramp?

(15pts)



(b) What maximum height above the ground will the kid reach?

(10pts)