**THE INTERNATIONAL UNIVERSITY (IU)**

**VIETNAM NATIONAL UNIVERSITY - HCMC**

**assignment**

**SUBJECT**: **PHYSICS 1**

**GROUP:** 8 – 10 STUDENTS

**(To submit the 22th MAY 2019)**

**Student Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Student ID:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**1/ (25 pts)** A 28-kg rock approaches the foot of a hill with a speed of 15 m/s. This hill slopes upward at a constant angle of 40.0o above the horizontal. The coefficients of static

and kinetic friction between the hill and the rock are 0.75 and 0.20, respectively.

(a) Use energy conservation to find the maximum height above the foot of the hill reached by the rock.

(b) Will the rock remain at rest at its highest point, or will it slide back down the hill?

(c) If the rock does slide back down, find its speed when it returns to the bottom of the hill.

**2/ (25 pts)** A particle of mass 5 kg, moving at 2 m/s, collides with a particle of mass 8 kg initially at rest. If the collision is elastic, find the velocity of each particle after the collision

(a) if the collision is head-on.

(b) if the first particle is defected 50o from its original direction of motion. Express all directions relative to the direction of the incoming particle.



Figure 1

**3/ (25 pts)** Consider a block on a table as shown in Figure 1. This block is pushed by a spring attached to the wall, slides across the table, and then falls to the ground. The block has a mass *m* =1.35 kg. The spring constant is *k* = 560 N/m, and the spring has been compressed by 0.11 m. The block slides a distance *d* = 0.65 m across the table of height *h* = 0.75 m.

(a) Consider the situation without the friction force. What speed will the block have when it lands on the floor?

(b) The coefficient of kinetic friction between the block and the table is *μ*k = 0.16. What speed will the block have when it lands on the floor?

**4/ (25 pts)** Suppose you throw a ball with a mass of 0.40 kg against a brick wall. It hits the wall moving horizontally to the left at 30 m/s and rebounds horizontally to the right at 20 m/s.

(a) Find the impulse of the net force on the ball during its collision with the wall.

(b) If the ball is in contact with the wall for 0.01 0 s, find the average horizontal force that the wall exerts on the ball during the impact.

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**The end**