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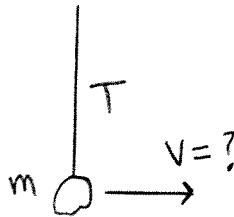
Lab Section Number _____

Exam 2 Chapt. 6-8 in Young&Geller

Multiple Choice questions. Circle the correct answer. No work needs to be shown.

(6 pts) 1. A small rock with mass $m = 0.20$ kg swings back and forth on the end of a 2.0 m long string. As the rock passes through its lowest point, with the string vertical, the tension in the string is $T = 3.92$ N. At this point the speed of the rock is

- a
- (a) 4.43 m/s
 - (b) 6.26 m/s
 - (c) 7.67 m/s
 - (d) 8.85 m/s
 - (e) 10.8 m/s
 - (f) none of the above values



(5 pts) 2. A block slides up an incline from point A at the bottom to point B at the top of the incline. During the motion from point A to point B , the work done by the gravity force on the rock is

- c
- (a) zero
 - (b) positive
 - (c) negative

(5 pts) 3. In question 2, the work done by the normal force on the rock is

- a
- (a) zero
 - (b) positive
 - (c) negative

(5 pts) 4. At point A an object has speed 8 m/s . At point B it has speed 12 m/s . During the motion from A to B the total work done on the object is

- b
- (a) zero
 - (b) positive
 - (c) negative

(5 pts) 5. On a horizontal frictionless surface a 5 kg block moving at 8 m/s collides with a 55 kg block that is initially at rest. Which of the following statements is correct:

- b
- (a) the magnitude of the change in momentum for the 5 kg block is less than the magnitude of the change in momentum for the 55 kg block.
 - (b) the magnitude of the change in momentum for the 5 kg block is the same as the magnitude of the change in momentum for the 55 kg block.
 - (c) the magnitude of the change in momentum for the 5 kg block is greater than the magnitude of the change in momentum for the 55 kg block.

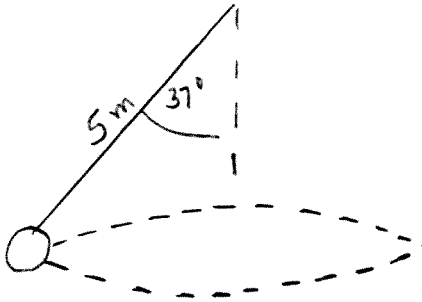
(6 pts) 6. A 98 kg block is at rest on a horizontal frictionless surface and is attached to one end of a horizontal spring. The other end of the spring is attached to the wall. A 2 kg block traveling horizontally at 10 m/s strikes the 98 kg block and sticks to it. After the collision the maximum elastic potential energy stored in the spring is

- c
- (a) 5000 J
 - (b) 0.20 J
 - (c) 2.0 J
 - (d) 49 J
 - (e) 100 J
 - (f) none of the above answers



On the following problems show all your work. Partial credit will be given if earned. Write your answers in the blanks provided.

(18 pts) 7. A small rock attached to one end of a 5.0 m long string swings in a horizontal circle at constant speed. The angle between the string and the vertical direction is 37° and is constant. The tension in the string is $T = 40 \text{ N}$.



(a) What is the mass of the rock?

Ans. 3.26 kg

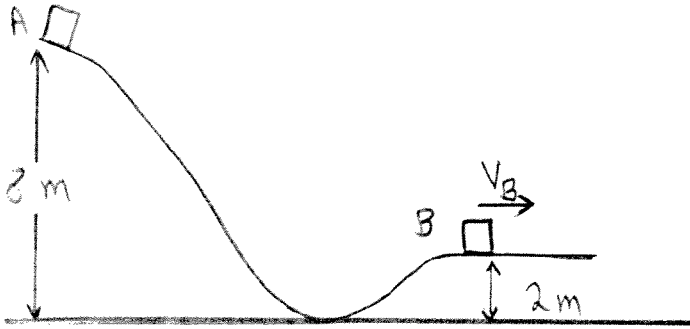
(b) How much time does it take the rock to complete one complete revolution?

Ans. 4.05

(18 pts) 8. On Planet X you throw an object straight up with a speed of 8 m/s and find that it reaches a maximum height of 48 m above the point from which it was thrown. The mass of Planet X is 6.0×10^{24} kg. What is the radius of Planet X?

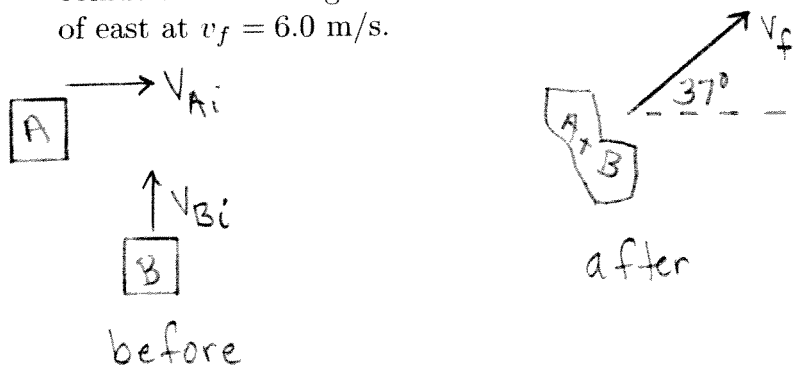
Ans. 2.45×10^7 m

(16 pts) 9. A block with mass 2.0 kg is released from rest at point A on a metal track and slides to point B , as shown on the sketch. At point B the block has speed $v_B = 5.0\text{ m/s}$. Point A is 8.0 m above the ground and point B is 2.0 m above the ground. How much work is done on the block by friction as the block moves from point A to point B ? (You must indicate whether your answer is positive or negative.)



Ans. -92.6 J

(16 pts) 10. On a horizontal frictionless surface block A (mass 2.0 kg) is sliding toward the east with speed v_{Ai} and block B (mass 4.0 kg) is sliding north at speed v_{Bi} . The blocks collide and stick together. After the collision the combined object is moving at 37° north of east at $v_f = 6.0\text{ m/s}$.



(a) What is was the initial speed v_{Ai} of block A ?

Ans. 14.4 m/s

(b) What is was the initial speed v_{Bi} of block B ?

Ans. 5.4 m/s