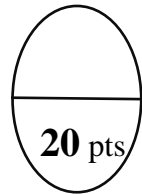




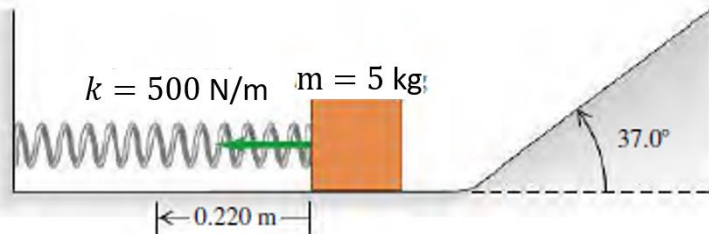
NAME: \_\_\_\_\_ Stud. No.: \_\_\_\_\_  
CLASS TIME: \_\_\_\_\_ Date Submitted: \_\_\_\_\_



**Phys 31 Online Quiz # 1**  
March 17, 2020 9:00AM

For those students who can submit online **on or before** the extended deadline @ 5:00AM March 18, 2020, choose only **ONE OUT OF FOUR** problems (if you answered all, it's OK, and I'll choose only one of your correct answer). Beyond 5:00AM or until resume of classes, **SOLVE ALL**. Your score are based on your answers. The lowest score can be obtain is 3pts out of 20pts. Note: **HAND WRITTEN AND STEP-BY STEP SOLUTIONS** and send to email: [mfsacedon@gmail.com](mailto:mfsacedon@gmail.com).

**Problem 1:** A 5kg block is pushed against a spring with negligible mass and force constant  $k = 500 \text{ N/m}$ , compressing it 0.220 m. When the block is released, it moves along horizontal frictionless surface and then up an incline plane with slope  $37^\circ$  and with  $\mu_k = 0.15$  (Figure). (a) What is the speed of the block as it slides along the horizontal surface after having left the spring? (b) How far does the block travel up the incline before starting to slide back down?



**Problem 2.** A 80-kg roofer climbs a vertical 8.0-m ladder to the flat roof of a house. He then walks 13 m on the roof, climbs down another vertical 8.0-m ladder, and finally walks on the ground back to his starting point. How much work is done on him by gravity (a) as he climbs up; (b) as he climbs down; (c) as he walks on the roof and on the ground? (d) What is the total work done on him by gravity during this round trip? (e) On the basis of your answer to part (d), would you say that gravity is a conservative or nonconservative force? Explain.

**Problem 3** A 65.0-kg skier is moving at 5.80 m/s on a frictionless, horizontal, snow-covered plateau when she encounters a rough patch 5.20 m long. The coefficient of kinetic friction between this patch and her skis is 0.300. After crossing the rough patch and returning to friction-free snow, she skis down an icy, frictionless hill 2.50 m high. (a) How fast is the skier moving when she gets to the bottom of the hill? (b) How much internal energy was generated in crossing the rough patch?

**Problem 4.** A cutting tool under microprocessor control has several forces acting on it. One force is  $\vec{F} = -\alpha y^2 \hat{j}$ , a force in the negative  $y$ -direction whose magnitude depends on the position of the tool. For  $\alpha = 2.50\text{N/m}^3$ , consider the displacement of the tool from the origin to the point  $(x = 3.00\text{m}, y = 3.00\text{m})$ . (a) Calculate the work done on the tool by  $\vec{F}$  if this displacement is along the straight line  $y = x$  that connects these two points. (b) Calculate the work done on the tool by  $\vec{F}$  if the tool is first moved out along the  $x$ -axis to the point  $(x = 3.00\text{m}, y = 0\text{m})$  and then moved parallel to the  $y$ -axis to the point  $(x = 3.00\text{m}, y = 3.00\text{m})$ . (c) Compare the work done by  $\vec{F}$  along these two paths. Is  $\vec{F}$  conservative or non-conservative? Explain.

**Show your step-by step solutions.**

Deadline of Submission: March 18, 2020 5:00AM

Note: HAND WRITTEN SOLUTIONS

Picture your solutions then send to email: [mfsacedon@gmail.com](mailto:mfsacedon@gmail.com)

----- GOD BLESS YOU -----