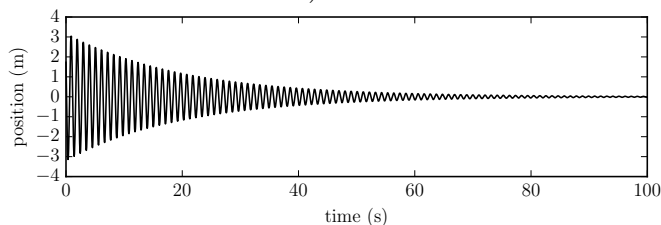


Name: _____ NetID: _____

NYU Physics I—Term Exam 4

Problem 1: Roughly what is the quality factor Q of this oscillator? (From Lecture on 2017-10-24.)



Problem 2: You calculated that a pendulum with a period of 2 s has a length very close to 1 m. What would be the length of a pendulum with a period of 8 s? (From Problem Set 7.)

Problem 3: A very thin ladder of length L and mass M leans against a vertical wall, on a horizontal floor, making an angle of θ with respect to the wall. Imagine that there is a large coefficient of friction μ at the floor such that the ladder is in static equilibrium, but assume that the wall is effectively frictionless. Draw a free-body diagram for the ladder, showing all forces acting. (From Problem Set 8.)

Problem 4: In the equation

$$m \frac{d^2x}{dt^2} + c \frac{dx}{dt} + kx = 0 \quad ,$$

what are the units of c ? (From Problem Set 8.)

Problem 5: A mass m attached to a spring of spring constant k is pulled a distance X from its equilibrium position. What is the potential energy in the spring? (From worksheet on oscillations.)

Problem 6: If you have a potential of the form

$$U(x) = Ax^3 - Bx + C$$

where A and B and C are positive constants, find a location x_0 where the force is zero. (From the worksheet on potentials.)