

Name _____

PHY2048C, Practice Quiz 5

A- Read all the quiz once, or twice, before beginning to write. Make sure to comprehend all questions and start with those you feel most confident in.

B – Be clear and concise. There are no extra points for being verbose or writing extra.

C –Only use the white pages that I will provide. You have 60 minutes to answer the quiz.

Problem 1

A simple harmonic oscillator ($k = 3 \text{ N/m}$) starts at $t=0$ with a position of $x = 10\text{m}$ and a velocity of 2 cm/s . What is the amplitude of the oscillator?

Problem 2

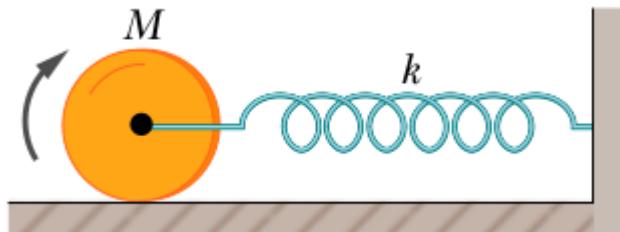
A damped oscillator with $k=10 \text{ N/m}$ and $\gamma = 2 \text{ N s/m}$ is released at $x = 1\text{m}$. In what time does it lose 50% of its energy?

Problem 3

Mr. Wu earned 40 cents from every magazine he sold. He earned an extra \$3 for every 30 magazines sold. How many magazines did he sell if he earned \$450 altogether?

Problem 4 (Extra)

In the figure, a solid cylinder attached to a horizontal spring ($k = 3.00 \text{ N/m}$) rolls without slipping along a horizontal surface. If the system is released from rest when the spring is stretched by 0.250 m , find (a) the translational kinetic energy and (b) the rotational kinetic energy of the cylinder as it passes through the equilibrium position.



Key Concept from Ch 9 and 13:

- (a) Damped and Driven Oscillators equations of motion ($F=ma$)
- (b) Energy of an oscillator
- (c) Solutions to the harmonic oscillator problem (complex exponential and trigonometric functions)
- (d) Period and amplitude of an oscillator. Maximum velocity of an oscillator.