

UNIVERSITY OF HARTFORD

COLLEGE OF ENGINEERING, TECHNOLOGY, AND ARCHITECTURE

Department of Mechanical, Aerospace, and Acoustical Engineering

ME 350 VIBRATIONS I: WITH APPLICATIONS SUMMER SEMESTER 2026

QUIZ 5 - 50 points !!!!!!!

NAME: _____

The objective of this quiz is to find a **simple harmonic motion system in your daily life**, take **measurements** of its natural frequency, and compare with the **calculated** natural frequency.

You will be submitting:

1. a short **report** including pictures, equations, and descriptions of your system
2. excel file with your **measurements**
3. MATLAB program of the **plot** of the SHM.

When taking measurements of your system, make sure to do **10 separate measurements** of at least **5 full cycles**. On the excel file, you should report all 10 measurements, specifically the period and natural frequency calculated from said period. Make sure to also include an average at the bottom.

In your report, make sure to ...

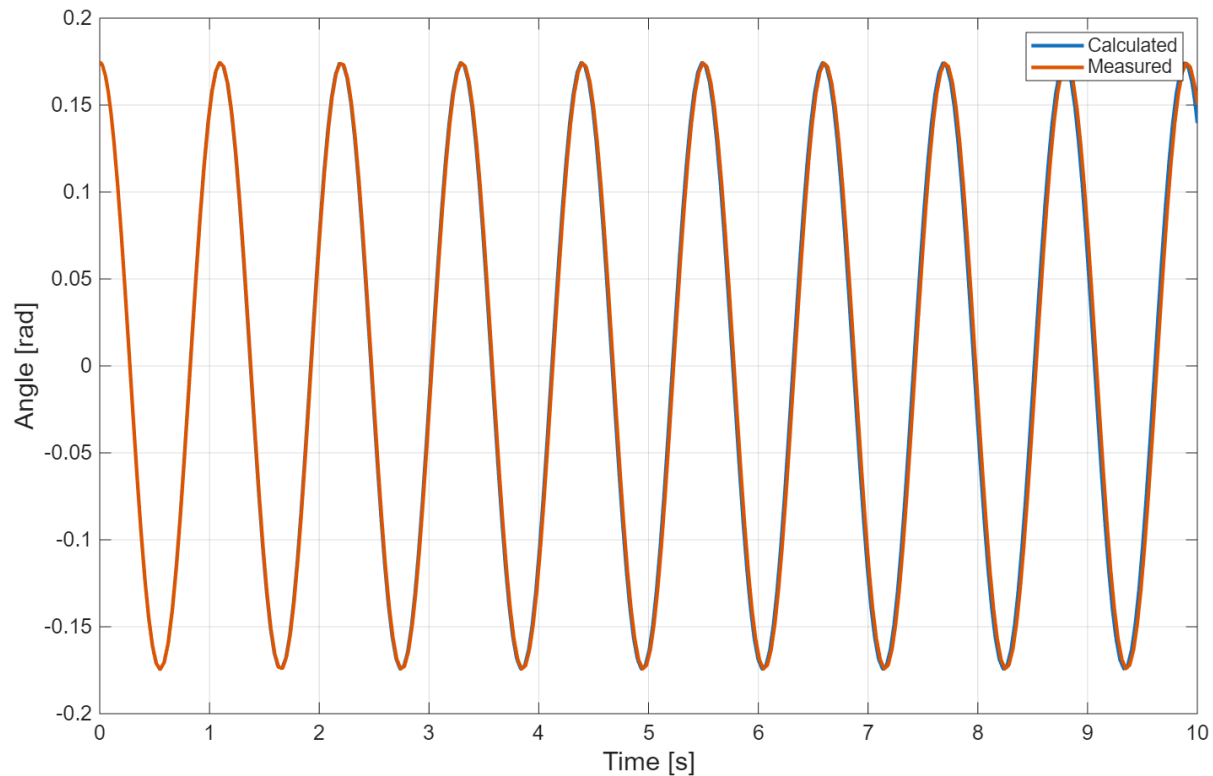
- include a picture of your system
- identify or define the “concept” of the SHM and what it is that you are measuring (i.e. person on a swing, person walking with groceries, etc.)
- define your variables
- write out equation used to find natural frequency, along with the equation of motion
- include a screenshot of your excel file
- include and compare measured frequency vs calculated frequency
- include plot(s) from MATLAB program
- discuss results and justifications for potential discrepancies or other findings

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For the MATLAB program, you can simply plot a sine wave with the natural frequency measured vs calculated. You can submit ONE plot with both measured & calculated natural frequencies. Make sure your plots show the full duration of at least 5 full cycles and corresponding amplitude of the motion – i.e. your x-axis should be in terms of “time [s]” and y-axis should be “amplitude [m]” or “angle [degrees]” depending on what type of system you choose. Below is an example of a plot:



If you need help with MATLAB, first look through the MATLAB documentation or forums to see if you can find how to plot sine waves c: