

Name: _____

Total Marks :40

Roll No. :

Instructions:

- Take the screen shots of all your tasks and their outputs and make a single pdf file.
- Upload the single file in pdf format on google classroom.
- Also upload the ipynb or text file that contains the code

Lab Task 4:

- Write a Python program to plot SHM displacements at different phase constants (0° , 45° , 90° and 180°). Take $x_m = 2\text{m}$, $\omega = 3\text{ rad/s}$. Explain your graphs
- Write a Python program to plot the graph between KE, PE and total energy of a spring-block system with respect to time t . Explain your graphs. Let $m = 2.72 \times 10^{-5}\text{ kg}$, $f = 10\text{ Hz}$ and amplitude $x_m = 20\text{ cm}$. Take values of t from 0 to 20 s with step size of 0.1.
- Write a Python program to plot the graph between KE, PE and total energy of a spring-block system with respect to displacement x . Explain your graphs. Let $m = 2.72 \times 10^{-5}\text{ kg}$, $f = 10\text{ Hz}$ and amplitude $x_m = 20\text{ cm}$. Take values of t from 0 to 20 s with step size of 0.1.
- Write a Python function which inputs time values, damping constant, mass, angular frequency and phase constant and determines whether the system is undamped, underdamped, overdamped or critically damped.
 - Check your function for different test input values and plot the graph between x and t as well.