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A/L -Physics

Part A

1. An object executes a simple harmonic motion and the displacement at time t is represented by the equation, $x = 0.5\sin(2t + 1)$ Calculate the following terms.

1.Amplitude 2. Angular velocity 3. Periodic time

4. Frequency 5. Phase angle

2. An object of mass 3kg, executes simple harmonic motion with amplitude 1.5m. The kinetic energy of an object at the center point 6J.

i.Find the periodic time.

ii.Find the percentage of kinetic energy remains, when its amplitude becomes 1/3

3. Two simple pendulums of length 1m and 16m, start simple harmonic motion at the center point in same phase. The periodic time of short pendulum t. Find the time taken to return both pendulum in same phase again.

4. Select the correct statement

A. Consider an object executes a simple harmonic motion

1.At the maximum displacement acceleration, also maximum

2 . At the maximum displacement speed also maximum

3. At the maximum speed acceleration also maximum

4. Maximum potential energy larger than maximum kinetic energy

5. Acceleration remains constant

Part B

Q1. A spring of mass m_0 connected vertically and a light balance pan was connected free end. The mass M was placed on the pan and exerted force down and slightly released. The periodic time for small angle given by the equation, $T = 2\pi\sqrt{\frac{M+\frac{m_0}{3}}{k}}$ K, is a spring constant. A student measured time taken for five oscillations and recorded as follows,

M kg	Time taken for the five oscillations	Time taken for the one oscillation
0.100	5.4	
0.200	5.5	
0.300	6.5	
0.400	7.4	
0.500	8.3	

1. How do you think about the number of oscillations in this experiment?
2. Rearrange the above equation to draw a suitable graph and draw a graph using graph paper
3. Calculate a gradient of the graph
4. Find the spring constant
5. Get the mass of the spring using above graph.