

A-Level Physics Summer Work

Section A - Research

Research the models of the atom listed below, giving a brief description of each, and if you can, the experiment that suggested the previous model needed correcting:

Thomson's Plum Pudding Model

Rutherford Model of the Atom

Bohr Model of the Atom

Section B - Simple Harmonic Motion

In class we looked at pendulums and masses suspended by springs.

Oscillations like this are referred to as simple harmonic motion, or SHM.

Below are the formulae for the time period, T of each system. This is the time taken for one complete oscillation.

Pendulum	Mass-Spring System
$T = 2\pi\sqrt{\frac{L}{g}}$	$T = 2\pi\sqrt{\frac{m}{k}}$

Task 1

Rearrange to make L the subject of the equation on the left.

Rearrange to make k the subject of the equation on the right.

Task 2

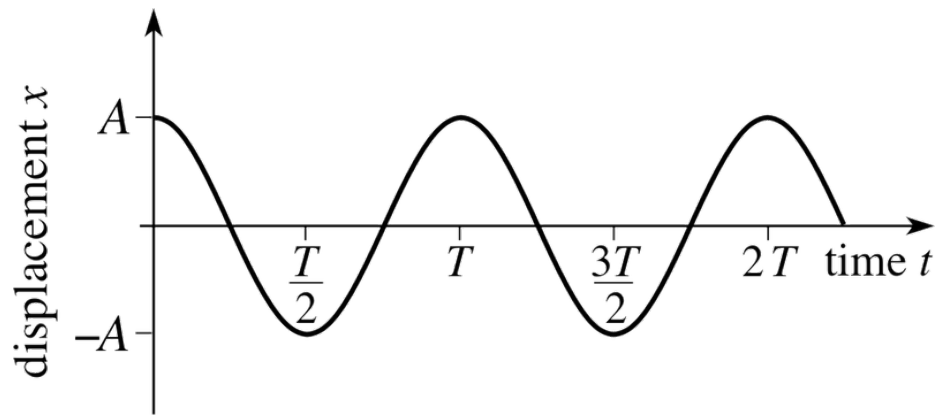
On earth, how long would a pendulum need to be to have a time period of 1 second.

If you moved this pendulum to the surface of the moon, what would its new time period be?

(moon $g = 1.625\text{ms}^{-2}$)

Task 3

Below is a graph showing the position of a pendulum against time for 2 oscillations.



Use your knowledge of velocity and acceleration graphs to plot graphs showing how the velocity and acceleration vary with time over two oscillations.

Section C - Task 4

Research the term resonance in physics. Then explain what it means, how it occurs, and where it can be observed. Some examples to research are:

- Tacoma Narrows Bridge
- London Foot Bridge
- Soldiers Breaking Step
- Breaking a glass with your voice