Simple Harmonic Motion

Checklist statement	✓
I can describe the key characteristics of simple harmonic motion (SHM).	☐
I can state the condition for SHM, that acceleration is proportional to and in the opposite direction to displacement.	☐
I can apply $a = -\omega^2 x$, define all terms and know their standard units.	☐
I can apply $x = A\cos\ \omega t$, define all terms and know their standard units.	☐
I can apply $v = \pm\omega\sqrt{A^2 - x^2}$, define all terms and know their standard units.	☐
I can describe how displacement, velocity and acceleration vary with time for SHM.	☐
I can explain how the velocity–time graph is related to the displacement–time graph.	☐
I can explain how the acceleration–time graph is related to the velocity–time graph.	☐
I can apply the expression for maximum speed, $v_{\text{max}} = \omega A$, define all terms and know their standard units.	☐
I can apply the expression for maximum acceleration, $a_{\text{max}} = \omega^2 A$, define all terms and know their standard units.	☐

Simple Harmonic Systems

Checklist statement	✓
I can describe the mass–spring system as an example of SHM.	☐
I can apply $T = 2\pi\sqrt{\frac{m}{k}}$, define all terms and know their standard units	☐
I can describe the simple pendulum as an example of SHM for small angles.	☐
I can apply $T = 2\pi\sqrt{\frac{l}{g}}$, define all terms and know their standard units.	☐
I can describe how kinetic energy, potential energy and total energy vary with displacement and time in SHM.	☐
I can describe the effects of damping on oscillations.	☐
I can describe a required practical investigating SHM using a mass–spring system and a simple pendulum.	☐

Forced Vibrations and Resonance

Checklist statement	✓
I can describe free vibrations and forced vibrations.	☐
I can explain resonance.	☐
I can describe how damping affects the sharpness of resonance.	☐
I can give examples of resonance and damping in mechanical systems and in situations involving stationary waves.	☐