Essential Pre-Uni Physics F3.5

A Level

Complete the questions in the table by converting the units.

Time period / s	Frequency / Hz	Angular velocity / $\mathrm{rad\,s^{-1}}$	Revolutions per minute (rpm)
(a)	(b)	(c)	3800

Part A Time period

a) Time period to 2 significant figures?

Part B Frequency

b) Frequency to 2 significant figures?

Part C Angular velocity

c) Angular velocity to 2 significant figures?

Essential Pre-Uni Physics F3.9

A Level

An astronaut's training centrifuge has a radius of $4.0\,\mathrm{m}$. If it goes round once every $2.5\,\mathrm{s}$, calculate the velocity of the end of the centrifuge arm ($4.0\,\mathrm{m}$ from the pivot).

Gameboard:
STEM SMART Physics 45 - Revision - Circles & Oscillations

Essential Pre-Uni Physics F4.3

A Level

Calculate the force needed to hold a $55\,\mathrm{kg}$ teenager in place when in a horizontal fairground ride of radius $3.5\,\mathrm{m}$ going round once in $5.0\,\mathrm{seconds}$.

Gameboard:
STEM SMART Physics 45 - Revision - Circles & Oscillations

Essential Pre-Uni Physics F7.4

A Level

A mass of $2.0\,\mathrm{kg}$ is suspended from a spring with constant $24\,\mathrm{N\,m^{-1}}$. Calculate the time period of the oscillation.

Gameboard:

STEM SMART Physics 45 - Revision - Circles & Oscillations

Essential Pre-Uni Physics F7.2

A Level

You must give the correct units.

Calculate the maximum speed of an oscillator if its amplitude is $3.0\,\mathrm{cm}$ and its time period is $0.65\,\mathrm{s}$.

Gameboard:
STEM SMART Physics 45 - Revision - Circles & Oscillations

Essential Pre-Uni Physics F7.7

A Level

C C C

You must give the correct units.

Dr Nasty hates laundry. He designs $40\,\mathrm{kg}$ washing machines which resonate when they spin the clothes. His machine spins at $1200\,\mathrm{rpm}$, and when it resonates, it lurches about in the kitchen, putting holes in the cupboards and making a lot of noise. Calculate the 'spring constant' he designs the machines to have in order to achieve his horrible plan. Give your answer to 2 significant figures.

Gameboard:
STEM SMART Physics 45 - Revision - Circles & Oscillations

Vertical Circles 19.4

A Level

A $850\,\mathrm{kg}$ roller-coaster train goes over the top of a loop at $9.5\,\mathrm{m\,s^{-1}}$. The loop has a radius of $4.5\,\mathrm{m}$.

Calculate the reaction force on the train. Use a negative number if the force is downwards.