



Physics. *You work it out.*

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Essential Pre-Uni Physics F1.8



Please give your answer to the lowest number of significant figures given in the question. You will not get the mark unless the correct unit is given. In this question, ignore the effects of friction & drag.

Calculate the force needed to accelerate a 50000 kg spacecraft from rest to 7000 m s^{-1} in four minutes. Give your answer to 3 significant figures.

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Essential Pre-Uni Physics F1.9

GCSE A Level



Please give your answer to the lowest number of significant figures given in the question. You will not get the mark unless the correct unit is given. In this question, ignore the effects of friction & drag.

An alpha particle (mass = $6.7 \times 10^{-27} \text{ kg}$) is fired at the nucleus in a gold atom with a speed of $3.5 \times 10^6 \text{ m s}^{-1}$. It bounces off at the same speed in the opposite direction. If the collision takes 10^{-19} s , what is the magnitude of the average force? Give your answer to 2 significant figures.

Gameboard:

STEM SMART Physics 46 - Revision - Circles & Oscillations

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Essential Pre-Uni Physics F2.7



I am stranded, stationary, in space, but near to my spacecraft. I detach my 30 kg oxygen cylinder, and fling it away from the spacecraft with a speed of 3.0 m s^{-1} . If my mass (without the cylinder) is 80 kg, how fast will I travel in the other direction towards my spacecraft?

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Essential Pre-Uni Physics F3.5



Complete the questions in the table by converting the units.

Time period / s	Frequency / Hz	Angular velocity / 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?

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Essential Pre-Uni Physics F3.9

A Level



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

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Essential Pre-Uni Physics F4.3

A Level



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

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Essential Pre-Uni Physics F4.4

A Level



Part A The Earth's orbit

Calculate the force needed to keep the Earth (mass $6.4 \times 10^{24} \text{ kg}$) in its orbit around the Sun (radius $1.5 \times 10^{11} \text{ m}$). The Earth takes $365\frac{1}{4}$ days to orbit the Sun once.

Part B Name of the force

What is the name of the force which keeps the Moon going round the Earth?

Gravity



Mass



Electromagnetism

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Essential Pre-Uni Physics F7.4

A Level



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

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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 cm and its time period is 0.65 s.

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Essential Pre-Uni Physics F7.7

A Level



You must give the correct units.

Dr Nasty hates laundry. He designs 40 kg washing machines which resonate when they spin the clothes. His machine spins at 1200 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.

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