

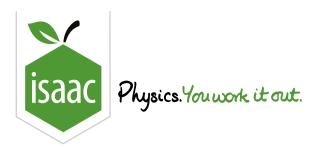
Home Gameboard Physics Mechanics Dynamics Essential Pre-Uni Physics F1.8

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 $50000\,\mathrm{kg}$ spacecraft from rest to $7000\,\mathrm{m\,s^{-1}}$ in four minutes. Give your answer to 3 significant figures.



Home Gameboard Physics Mechanics Dynamics Essential Pre-Uni Physics F1.9

Essential Pre-Uni Physics F1.9

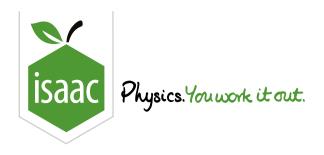


Please give your answer to the lowest number of significant figures given in the question. You will not get the mark unless the correct unit is given. In this question, ignore the effects of friction & drag.

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

Gameboard:

STEM SMART Physics 46 - Revision - Circles & Oscillations



<u>Home</u> <u>Gameboard</u>

Physics

Mechanics Dynamics

Essential Pre-Uni Physics F2.7

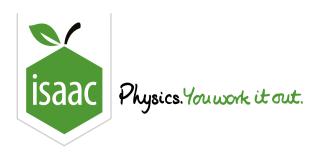
Essential Pre-Uni Physics F2.7



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

Gameboard:

STEM SMART Physics 46 - Revision - Circles & Oscillations



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<u>neboard</u> Physics

Mechanics

Circular Motion

Essential Pre-Uni Physics F3.5

Essential Pre-Uni Physics F3.5



Complete the questions in the table by converting the units.

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

Part A Time period

a) Time period to 2 significant figures?

Part B Frequency

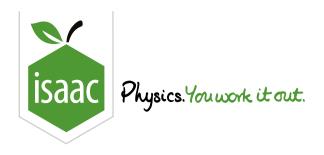
b) Frequency to 2 significant figures?

Part C Angular velocity

c) Angular velocity to 2 significant figures?

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Physics

Mechanics

Circular Motion

Essential Pre-Uni Physics F3.9

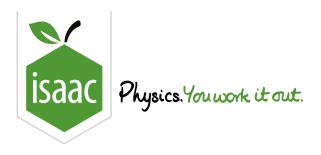
Essential Pre-Uni Physics F3.9



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:

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Home Gameboard Physics Mechanics Circular Motion Essential Pre-Uni Physics F4.3

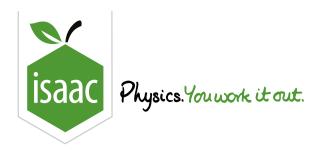
Essential Pre-Uni Physics F4.3



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 46 - Revision - Circles & Oscillations



Home Gameboard Physics Mechanics Circular Motion Essential Pre-Uni Physics F4.4

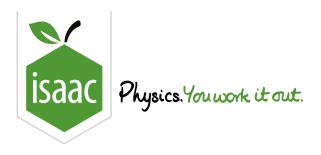
Essential Pre-Uni Physics F4.4



Part A The Earth's orbit			
Calculate the force needed to keep the Earth (mass $6.4 \times 10^{24}{\rm kg}$) in its orbit around the Sun (radius $1.5 \times 10^{11}{\rm m}$). 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			

Gameboard:

STEM SMART Physics 46 - Revision - Circles & Oscillations



Home Gameboard Physics Mechanics Oscillations Essential Pre-Uni Physics F7.4

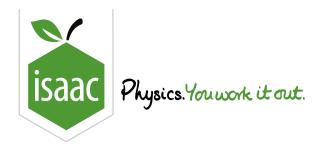
Essential Pre-Uni Physics F7.4



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 46 - Revision - Circles & Oscillations



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Physics

Mechanics Oscillations

Essential Pre-Uni Physics F7.2

Essential Pre-Uni Physics F7.2

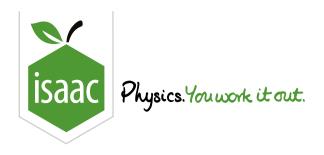


You must give the correct units.

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 46 - Revision - Circles & Oscillations



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oard Physics

Mechanics

Oscillations

Essential Pre-Uni Physics F7.7

Essential Pre-Uni Physics F7.7



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.