

Mechanics

Dynamics

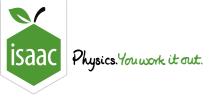
Essential Pre-Uni Physics F1.4

Essential Pre-Uni Physics F1.4



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.

A $50\,\mathrm{g}$ ball is travelling at $2.0\,\mathrm{m\,s^{-1}}$ when it hits a wall and rebounds at $1.5\,\mathrm{m\,s^{-1}}$. Calculate the magnitude of the change in momentum.



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Dynamics

Essential Pre-Uni Physics F1.6

Essential Pre-Uni Physics F1.6



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.

A $70 \,\mathrm{kg}$ person jumps in the air and is travelling downwards at $2.0 \,\mathrm{m\,s^{-1}}$ when their feet touch the ground. If it takes the person $0.30 \,\mathrm{s}$ to stop, calculate the constant resultant force on them.



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Dynamics

Essential Pre-Uni Physics F1.3

Essential Pre-Uni Physics F1.3



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.

If a $20000 \,\mathrm{kg}$ bus accelerates from $10 \,\mathrm{m\,s^{-1}}$ to $25 \,\mathrm{m\,s^{-1}}$, what is the change in momentum?



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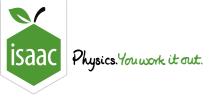
Dynamics

Momentum and Kinetic Energy 3.12

Momentum and Kinetic Energy 3.12



A $15\,\mathrm{g}$ bullet hits and stops within a $1.500\,\mathrm{kg}$ sandbag, which then swings up by a height of $5.1\,\mathrm{cm}$. Work out the initial speed of the bullet.



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Essential Pre-Uni Physics F1.1

Essential Pre-Uni Physics F1.1



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.

What is the momentum of a $750 \,\mathrm{kg}$ car going at $31 \,\mathrm{m \, s^{-1}}$?



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Momentum and Kinetic Energy 3.11

Momentum and Kinetic Energy 3.11



A $10\,\mathrm{MeV}$ particle in a particle detector travels on a curved path in a magnetic field. Its charge is $1.60\times10^{-19}\,\mathrm{C}$. From the curvature, the momentum of the particle is calculated to be $7.31\times 10^{-20}\,kg\,m\,s^{-1}.$

Part A	What is the mass of the particle?
What is the mass of the particle?	
Part B	What is the particle?
What is the particle?	
	Electron
	Positron
	Alpha particle
	Proton
	Neutron



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Essential Pre-Uni Physics F2.3

Essential Pre-Uni Physics F2.3



A neutron (mass $= 1\,\mathrm{u}$) is moving at $300\,\mathrm{m\,s^{-1}}$ when it smacks into a stationary ^{235}U nucleus (mass $= 235\,\mathrm{u}$), and sticks to it. What will the velocity of the combined particle be? Give your answer to 3 significant figures.



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Physics

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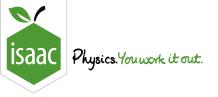
Dynamics

Essential Pre-Uni Physics F2.2

Essential Pre-Uni Physics F2.2



Charlie is driving her $20\,000\,\mathrm{kg}$ bus. She stops at a roundabout. Percy is driving his $750\,\mathrm{kg}$ Corsa at $15\,\mathrm{m\,s^{-1}}$ behind her. He fails to stop and rams into the back of the bus, sticking to it. The impact releases the brakes on the bus. How fast will the combined vehicle be travelling immediately after the collision? Give your answer to 2 significant figures.



<u>Home</u> **Physics**

Mechanics Dynamics Launching a Rocket

Launching a Rocket



A rocket with initial mass M_0 and exhaust speed v is sitting on its launch pad. Its engines eject mass at a constant rate of magnitude $\left| rac{\mathrm{d}M}{\mathrm{d}t}
ight| = \mu$.

Part A **Initial acceleration**

What is the initial acceleration, a_0 ?

The following symbols may be useful: M_0, a_0, g, mu, v

Rate of mass ejection Part B

Given that $M_0=1.00 imes 10^6\,\mathrm{kg}$, $v=2000\,\mathrm{m\,s^{-1}}$ and we require $a_0=0.500\,\mathrm{m\,s^{-2}}$, what must μ be?

Adapted with permission from HE+.



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Physics

Mechanics Dynamics Momentum and Kinetic Energy 3.2

Momentum and Kinetic Energy 3.2



Calculate the kinetic energy of a $p=23\,700\,\mathrm{kg}\,\mathrm{m}\,\mathrm{s}^{-1}$, $720\,\mathrm{kg}$ car.