

MINISTRY OF EDUCATION
SECONDARY ENGAGEMENT PROGRAMME
GRADE 10
PHYSICS

WEEK 11: Linear Momentum

WORKSHEET

Exam-style Questions

1. Abdul pulls a block of mass 8kg by means of a horizontal string across a horizontal surface. The tension in the string is 29N and the frictional force opposing the motion is 17N. Determine the acceleration.
2. Kenya leapt into the air and spiked the ball horizontally. It rocketed away at 25ms^{-1} but found the palms of Katelyn who struck the ball along its path with the same speed. If the force exerted by Katelyn was 1250N and the mass of the ball was 500g, determine the period of impact.
3. A body of mass 800g moves to the right at 4.0ms^{-1} and collides head-on with a lighter body of mass 200g which is moving to the left at 20ms^{-1} . After the collision, the heavier body rebounds at 5.6ms^{-1} . Determine the velocity of the lighter body immediately after the collision.
4. A stationary gun of mass 1.2kg is loaded with a bullet of mass 20g. Determine the recoil velocity of the gun as the bullet leaves its nozzle at 200ms^{-1} .
5. A bullet of mass (m_1) 100g is fired into a stationary target of mass (m_2) 4.0kg. The target is mounted on low friction wheels and moves off at a velocity of 5.0ms^{-1} when the bullet enters it. The bullet stays in the target. Calculate the velocity of the bullet before it strikes the target.
6. A frictionless trolley A, of mass 400g travelling along a straight level track at 5ms^{-1} collides with another frictionless, stationary trolley, B, of mass 600g. On impact, they stick together and move along with the same speed. Calculate the speed of the two trolleys just after they collide.

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Week 11: Newton's Laws Of Motion

Worksheet 2 - Answer Sheet

1. $a = 1.5\text{ms}^{-2}$
2. $T = 0.020\text{s}$
3. $v = 18\text{ms}^{-1}$ *towards the right*
4. *recoil velocity* $= 3.3\text{ms}^{-1}$ direction is implied (opposite to bullet)
5. *Initial velocity* $= 205\text{ms}^{-1}$
6. $v = 2\text{ms}^{-1}$