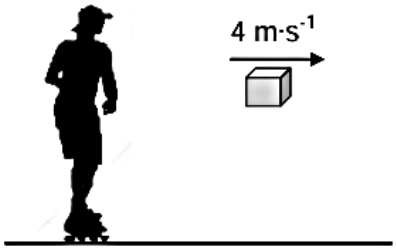
Momentum: Exam Revision Tracker

Attempt #1		Attempt #2		Attempt #3		Attempt #4		Attempt #5	
Total	Score	Total	Score	Total	Score	Total	Score	Total	Score
14		10		11		14		13	
Percentage =		Percentage =		Percentage =		Percentage =		Percentage =	

Momentum: Attempt #1

Total = 14 Marks

Initially a girl on roller skates is at rest on a smooth horizontal pavement. The girl throws a parcel, of mass 8 kg, horizontally to the right at a speed of 4 $m \cdot s^{-1}$. Immediately after the parcel has been thrown, the girl-roller-skate combination moves at a speed of 0,6 $m \cdot s^{-1}$. Ignore the effects of friction and rotation.



1. Define the term *momentum* in words. (2)

2. Will the girl-roller-skate combination move TO THE RIGHT or TO THE LEFT after the parcel is thrown?
NAME the law in physics that can be used to explain your choice of direction. (2)

The total mass of the roller skates is 2 kg.

3. Calculate the mass of the girl. (5)

4. Calculate the magnitude of the impulse that the girl-roller-skate combination is experiencing while the parcel is being thrown. (3)

5. Without any further calculation, write down the change in momentum experienced by the parcel while it is being thrown. (2)

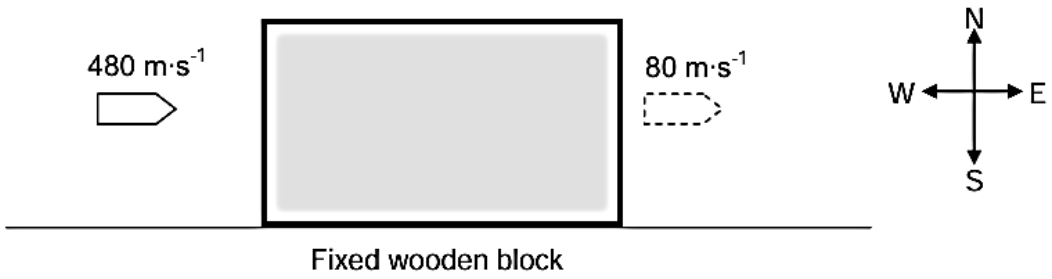
Momentum: Attempt #2

Total = 10 Marks

A bullet moves east at a velocity of 480 m·s^{-1}. It hits a wooden block that is fixed to the floor. The bullet takes 0,01 s to move through the stationary block and emerges from the block at a velocity of 80 m·s^{-1} east. See the diagram below.

Ignore the effects of air resistance.

Consider the block-bullet system as an isolated system.



1. Explain what is meant by an *isolated system* as used in Physics. (2)

The magnitude of the momentum of the bullet before it enters the block is 24 kg·m·s^{-1}.

2. Calculate the:

2.1 Mass of the bullet (3)

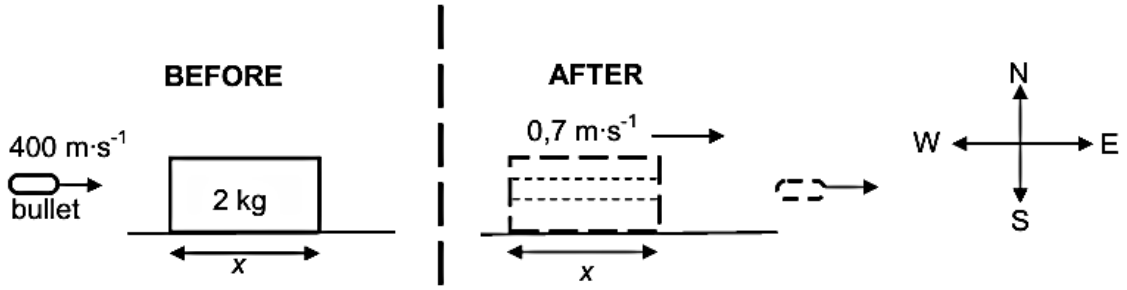
2.2 Average net force exerted by the wooden block on the bullet (5)

Momentum: Attempt #3

Total = 11 Marks

A 2 kg block is at rest on a smooth, frictionless, horizontal table. The length of the block is *x*.

A bullet of mass 0,015 kg, travelling east at 400 m·s^{-1}, strikes the block and passes straight through it with constant acceleration. Refer to the diagram below. Ignore any loss of mass of the bullet and the block.



1. State the *principle of conservation of linear momentum* in words. (2)

The block moves eastwards at 0,7 m·s^{-1} after the bullet has emerged from it.

2. Calculate the magnitude of the velocity of the bullet immediately after it emerges from the block. (4)

3. If the bullet takes 0,002 s to travel through the block, calculate the length, *x*, of the block. (5)

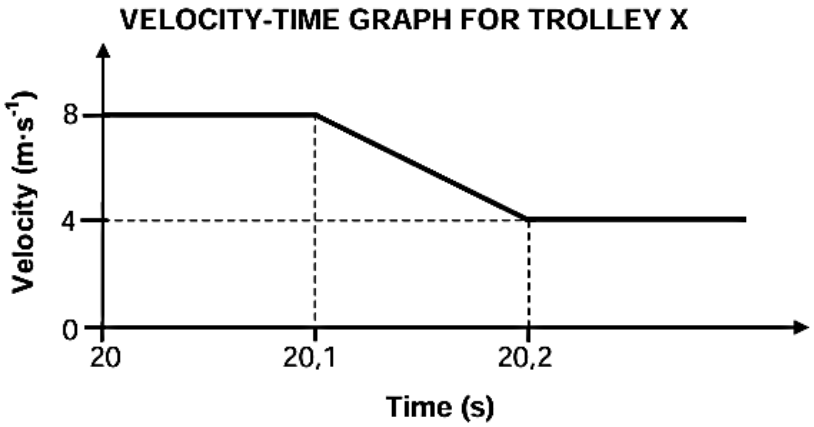
Momentum: Attempt #4

Total = 5 Marks

Trolley X of mass 1,2 kg travels at 8 m·s^{-1} east and collides with trolley Y of mass 0,5 kg which is initially at rest.

Ignore all frictional effects.

The velocity-time graph below shows the velocity of trolley X before, during and after the collision with trolley Y.



1. State the *principle of conservation of linear momentum.* (2)

2. Calculate the magnitude of the:

2.1 Velocity of trolley Y immediately after the collision (4)

2.2 Average net force that trolley X exerts on trolley Y during the collision (3)

3. Is the collision ELASTIC or INELASTIC?

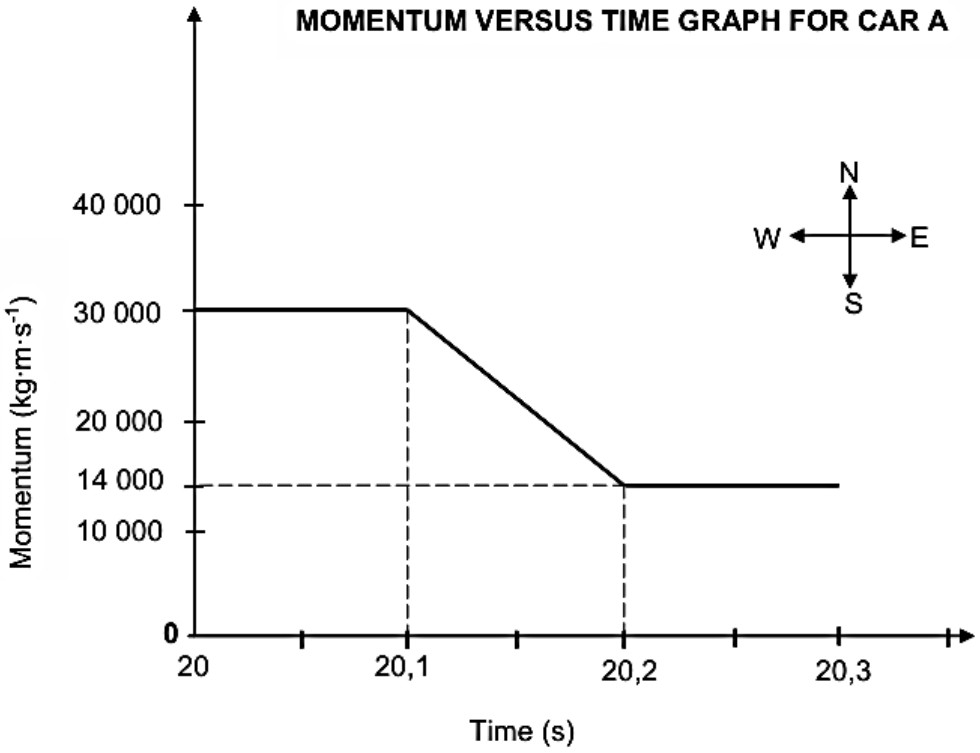
Explain the answer by means of suitable calculations. (5)

Momentum: Attempt #5 ⚡

Total = 13 Marks

The graph below shows how the momentum of car **A** changes with time *just before* and *just after* a head-on collision with car **B**.

Car **A** has a mass of 1 500 kg, while the mass of car **B** is 900 kg.
Car **B** was travelling at a constant velocity of 15 $m \cdot s^{-1}$ west before the collision.
Take east as positive and consider the system as isolated.



1. What do you understand by the term *isolated system* as used in physics? (1)

Use the information in the graph to answer the following questions.

2. Calculate the:

2.1 Magnitude of the velocity of car **A** just before the collision (3)

2.2 Velocity of car **B** just after the collision (5)

2.3 Magnitude of the net average force acting on car **A** during the collision (4)