Momentum

and Impulse

1

Momentum depends on

•

•

Specifically

or

2

Momentum

-
-
-
-

3

Impulse

-

- **Impulse – momentum theorem:**
  - **The impulse exerted on a body is equal to the change in the object's momentum**

$$\text{Impulse} = \Delta p$$
$$F\Delta t = \Delta p$$
$$F\Delta t = mv_f - mv_i$$
$$\Delta p = mv_f - mv_i$$

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Changing an Object's Momentum

- **How do we do it?**
  -
- **What if we need to stop something quickly?**
  -
- **What if there is a force limitation? (ie. Pain)**
  -
- **How do we cause a large change in momentum?**
  -

5

Airbags

- **How does an air bag use this concept of impulse to decrease the amount of force on your body?**

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Momentum/Impulse Example

- **A 2250 kg car traveling to the west is slowed uniformly from 20.0 m/s with a force of 8437.5 N for 4.00 s.**
  - **What is the change in the car's momentum (or its impulse)?**
  - **What is the speed of the car after the brakes are applied?**

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Given: **m =** **v_i =**

F = **t =**

Equations:

8

Momentum/Impulse Example 2

- **A 0.45 kg volleyball travels at 4.0 m/s over the net. You jump up and hit the ball back at a velocity of 7.0 m/s. If the contact time is 0.04 s,**
  - **What is the change in the ball's momentum?**
  - **What is force exerted on the ball?**

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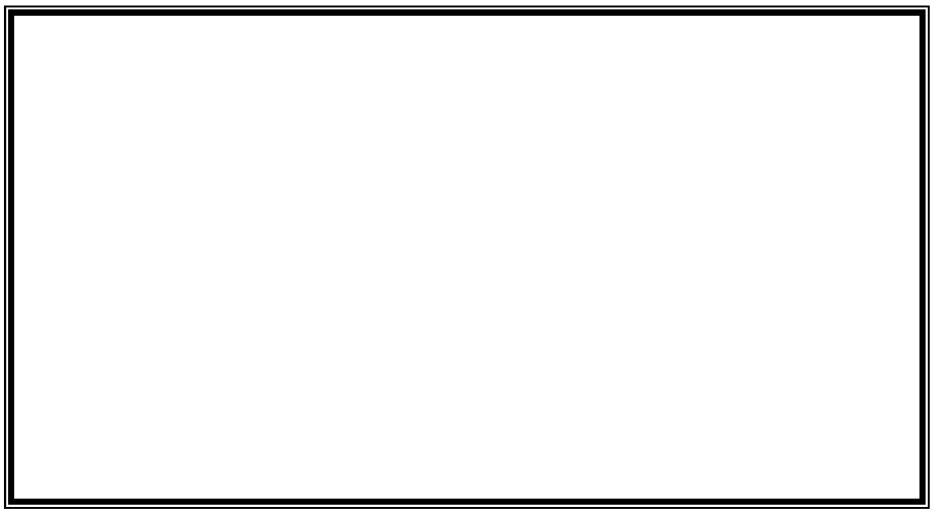
Given: **m =** **v_i =**

t = **v_f =**



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