Momentum and Impulse

- -Momentum is the product of mass and velocity
- -momentum is a vector quantity and is always in the direction of the velocity
- -units are <u>kg·m</u> s

Equation



where m=mass (kg) v=velocity (m/s)

Nov 9-8:26 PM

Example

Determine the momentum of a 0.300kg hockey puck travelling across the ice at 5.55m/s?

Impulse

-Impulse is the product of the force exerted on an object and the time interval over which the force acts

-essentiallyit is equal to the change in momentum that occurs during the interaction

-units are <u>kg·m</u> s

Equation



where F is the force applied (N)
t is the time it is applied for (s)

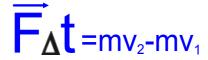
Nov 9-8:38 PM

Example

If a golf club exerts an average force of 5.25 X 10³ N[W] on a golf ball over a time interval of 5.45 X 10⁻⁴s, what is the impulse of the interaction?

Impulse-Momentum Theory

- -since impulse is the change in momentum, we can quantify the relationship in an equation
- -impulse is a vector quantity and the direction of the impulse is the same as the direction of the *change* in momentum



Nov 9-8:48 PM

Example

A student practises her tennis volleys by hitting a ball against a wall.

a) If the 0.600kg ball travels at 48m/s before hitting the wall and then bounces directly backward at 35m/s, what is the impulse of the interaction?

b) If the duration of the interactions is 25ms, what is the average force exerted on the ball by the wall?