

Module 07 - Lesson 4

The Impulse / Momentum Theorem

Question 1: A cart slides along a horizontal surface as it slows down due to kinetic friction characterized by a coefficient of value 0.30. How long does the cart take to slow down from 9.0 m/s to 6.0 m/s?

Question 2: A 140-g baseball is pitched at a batter with an initial velocity of -38 m/s (negative direction is towards the bat). The ball departs from the bat with a final velocity of +58 m/s. Assuming the bat applies an average force that is much greater than the weight of the ball, and that the time of contact with the bat is $\Delta t = 1.8 \times 10^{-3}$ s, find the average force exerted on the ball by the bat.

Problem: Rain comes down with a velocity of -15 m/s and hits the roof of a car. The mass of rain per second that strikes the roof of the car is 60 g/s. Assuming that rain comes to rest upon striking the car, find the average force exerted by the rain on the roof.