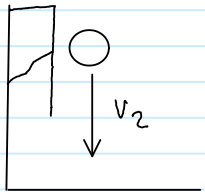
20-P-MOM-PT-008

December 31, 2020 3:24 AM

A volleyball has an initial velocity of 5 m/s up. It is spiked such that the velocity changes to 20 m/s down. If the mass of the ball is 0.350 kg, what is the impulse?



$mv_1 + I = mv_2$ down is positive: $v_1 = -5$ m/s $v_2 = 20$ m/s

$I = m(v_2 - v_1)$

$I = 0.350\ (20 - -5)$

$I = 8.75$ kg m/s down

If the force caused by the impulse was 200 N, what is the time of contact?

$I = \int F\,dt = F \cdot t$

$t = \frac{I}{F} = \frac{8.75}{200}$

$t = 0.04375$ seconds