

Answer on Question #65673-Physics-Mechanics

A 5.5kg rifle fires an 11gram bullet with a velocity of 1000m/s.

a. Find the velocity of a rifle?

b. if the shooter holds the rifle firmly with his shoulder what will be the velocity assume the mass of shooter is 120kg?

Solution

a. From the conservation of momentum:

$$mv = MV$$

$$V = \frac{m}{M}v = \frac{0.011}{5.5}1000 = 2.0 \frac{m}{s}.$$

b. From the conservation of momentum:

$$mv = (M + M_s)V'$$

$$V' = \frac{m}{M + M_s}v = \frac{0.011}{5.5 + 120}1000 = 0.088 \frac{m}{s}.$$