

Question

A gun fires a bullet of mass m with speed U into a block of wood of mass M which rests on a frictionless plane. If the bullet becomes embedded in the block determine the subsequent velocity of the block.

Answer

Conservation of linear momentum.

$mU = (M + m)V$ where V is the speed of the block and the bullet after impact.

$$\Rightarrow V = \frac{m}{M + m}U$$