

Question#22024

a gun fires a bullet of mass 50 gms. the bullet moves with a velocity of 100m/sec strikes a wooden plank and comes to rest on 0.05 seconds. calculate the force exerted by the wooden plank on the bullet

Solution:

Let:

$$m_1 = 50 \text{ g} = 0.05 \text{ kg}$$

$$v_1 = 100 \text{ m/s}$$

$$t = 0.05 \text{ s}$$

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$$F = ?$$

According to the law of conservation momentum:

$$m_1 v_1 = m_2 v_2,$$

where  $m_2$  is the mass of wooden plank,  $v_2$  is the velocity of wooden plank after striking

Such as:

$$v = at$$

According to the second Newton's law:

$$m_1 v_1 = m_2 \frac{F}{m_2} t$$

$$F = \frac{m_1 v_1}{t}$$

$$F = \frac{0.05 * 100}{0.05} = 100 \text{ N}$$

**Answer: 100 N**