

Homework

① Recall velocity of
~~force required to hold~~ the gem = $20 \times 10^3 \text{ m/s}$
= 100 dyne.

force required to hold the gem = $20 \times 10^3 \times 150$
= 3000 N.

② Law of conservation of momentum states that unless an external force is applied, the two or more objects acting upon each other in an isolated system, the total momentum of the system remains constant.

$$p = mv, \quad F_{AB} = -F_{BA} \quad \& \quad F = dp/dt$$

(3) A bomb at rest explodes into 2 pieces. Let the mass of bomb be M & mass of 2 pieces be m_1 & m_2 respectively. Now, according to conservation of momentum:-

$$Mv = m_1 v_1 + m_2 v_2$$

Here, $v = 0$ (bomb is at rest) & v_1 & v_2 are velocities of 2 masses after explosion.

$$M(0) = m_1 v_1 + m_2 v_2$$

$$m_1 v_1 + m_2 v_2 = 0$$

$$m_1 v_1 = -m_2 v_2$$

Masses can't be negative that means the sign belongs to velocities. Therefore, the 2 pieces travel in opposite direction.

(2) (3) 7.5 kg m/s ; (3) 1.15 m/s

~~(2)~~

