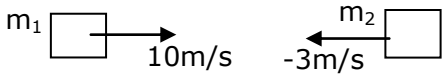
Q- A block of mass m_1 = 4kg moves to the right with a speed of v_1 = 10m/s toward a second block of mass m_2 = 5kg that moves to the left with a speed v_2 =3m/s. after the blocks collide; it is found that the m_1 remains stationary. Determine the coefficient of restitution between the two blocks.

Let the velocity of the m_2 after collision is v_2' then according to law of conservation of linear momentum we have

$$m_1\vec{v}_1 + m_2\vec{v}_2 = m_1\vec{v}'_1 + m_2\vec{v}'_2$$



Or $\quad 4*10 + 5(-3) = 4*0 + 5*v'_2$

Gives $\quad v'_2 = 5$ m/s

Now as the velocity of approach of the blocks is 10 – (-3) = 13 m/s and the velocity of their separation = 5 – 0 = 5 m/s the coefficient of restitution is given by

$$e = \frac{v_{sep}}{v_{app}} = \frac{5}{13} = 0.385$$