

1

Let v_A and v_B be the speeds of A and B respectively after the collision.

$$4mv_A + mv_B = 4mu$$

$$-v_A + v_B = eu$$

$$v_A = \frac{3}{4}u, \quad v_B = u$$

$$e = \frac{1}{4}$$

Alternative method for question 1

Let v_A and v_B be the speeds of A and B respectively after the collision.

$$4mv_A + mv_B = 4mu$$

$$-v_A + v_B = eu$$

$$v_A = \frac{1}{5}u(4 - e), \quad v_B = \frac{4}{5}u(1 + e)$$

$$\frac{4m\left(\frac{1}{5}u(4 - e)\right)}{m\left(\frac{4}{5}u(1 + e)\right)} = 3, \quad e = \frac{1}{4}$$