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6. Two particles, P and Q, are moving in opposite directions along the same straight line on a smooth horizontal surface so that the particles collide directly.
The mass of P is km and the mass of Q is m.
Immediately before the collision, the speed of P is x and the speed of Q is y.
Immediately after the collision, P and Q are moving in the same direction, the speed of P is v and the speed of Q is $2v$.

The coefficient of restitution between P and Q is $\frac{1}{5}$

The magnitude of the impulse received by Q in the collision is $5mv$

(a) Find (i) y in terms of v
(ii) x in terms of v
(iii) the value of k

(9)

(b) Find, in terms of m and v, the total kinetic energy lost in the collision between P and Q.

(3)

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Q6