2.

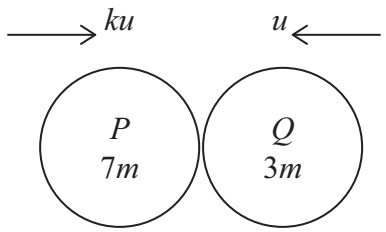


Figure 2

Particle P of mass $7m$ and particle Q of mass $3m$ are moving in opposite directions along the same straight line on a smooth horizontal surface. The particles collide directly.

Immediately **before** the collision, the speed of P is ku and the speed of Q is u, as shown in Figure 2.

Immediately **after** the collision, the speed of P is w and the speed of Q is $2w$.

The direction of motion of Q is reversed by the collision.

The impulse received by Q in the collision has magnitude $\frac{7}{2}mu$.

(a) Find w in terms of u.

(3)

(b) Find the two possible values of k.

(5)

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Question 2 continued

(Total for Question 2 is 8 marks)