1.

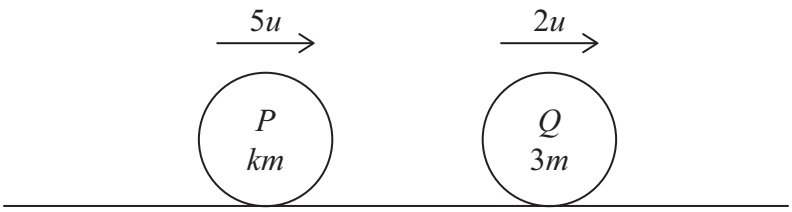


Figure 1

Figure 1 shows two particles, P and Q, moving in the same direction along the same straight line on a smooth horizontal surface.
Particle P has mass km and particle Q has mass $3m$
The particles collide directly.

Immediately before the collision, the speed of P is $5u$ and the speed of Q is $2u$

Immediately after the collision, the speed of P is $2u$ and its direction of motion is unchanged.

Immediately after the collision, the speed of Q is v

The impulse exerted on Q by P in the collision has magnitude $4.5mu$

(a) Find v in terms of u only.

(3)

(b) Find the value of k

(3)

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Question 1 continued

(Total for Question 1 is 6 marks)