2. Two particles, A and B, are moving in a straight line in opposite directions towards each other on a smooth horizontal surface when they collide directly.

Particle A has mass $3m$ kg and particle B has mass m kg.

Immediately before the collision, both particles have a speed of $1.5\,\text{m s}^{-1}$

Immediately after the collision, the direction of motion of A is unchanged and the difference between the speed of A and speed of B is $1\,\text{m s}^{-1}$

(a) Find (i) the speed of A immediately after the collision,

(ii) the speed of B immediately after the collision.

(5)

(b) Find, in terms of m, the magnitude of the impulse exerted on B in the collision.

(3)

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Question 2 continued

(Total for Question 2 is 8 marks)