5 When a particle P of mass m kg has speed $u\,\text{m s}^{-1}$, its momentum is 4 N s and its kinetic energy is 16 J.

(a) Find the value of m and the value of u. [3]

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P is now projected on a smooth horizontal surface with speed $v\,\text{m s}^{-1}$ directly towards a particle Q of mass 1.25 kg which is stationary. After P and Q collide, the velocity of P is $w\,\text{m s}^{-1}$ and the velocity of Q is $2w\,\text{m s}^{-1}$. The loss of kinetic energy in the collision is 25 J.

(b) Find the value of v and the value of w. [4]

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