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7. Particles A, B and C, of masses $8m$, $2m$ and $3m$ respectively, lie at rest in a straight line on a smooth horizontal plane with B between A and C.

Particles B and C are projected towards each other with speeds ku and $4u$ respectively so that they collide directly. Immediately after the collision, the speed of B is $2u$ and the speed of C is u, and, as a result of the collision, the direction of motion of each of B and C is reversed.

The total kinetic energy lost in the collision between B and C is λmu^2, where λ is a constant.

(a) Find the value of λ.

(5)

After the collision between B and C, particle B, moving with speed $2u$, collides directly with particle A. The coefficient of restitution between A and B is e.

Given that there is a second collision between B and C,

(b) find the range of possible values of e.

(6)

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