Three uniform small spheres $A$, $B$ and $C$ have equal radii and masses $2m$, $4m$ and $m$ respectively. The spheres are moving in a straight line on a smooth horizontal surface, with $B$ between $A$ and $C$. The coefficient of restitution between each pair of spheres is $e$. Spheres $A$ and $B$ are moving towards each other with speeds $2u$ and $u$ respectively. The first collision is between $A$ and $B$.

**(i)** Find the velocities of $A$ and $B$ after this collision. [3]

Sphere $C$ is moving towards $B$ with speed $\frac{4}{3}u$ and now collides with it. As a result of this collision, $B$ is brought to rest.

**(ii)** Find the value of $e$. [4]

**(iii)** Find the total kinetic energy lost by the three spheres as a result of the two collisions. [3]