Two uniform small smooth spheres $A$ and $B$ have equal radii and masses $5m$ and $2m$ respectively. Sphere $A$ is moving with speed $u$ on a smooth horizontal surface when it collides directly with sphere $B$ which is moving towards it with speed $2u$. The coefficient of restitution between the spheres is $e$.

**(i)** Show that the speed of $B$ after the collision is $\frac{1}{7}u\ 1 + 15e$ and find an expression for the speed of $A$. [4]

In the collision, the speed of $A$ is halved and its direction of motion is reversed.

**(ii)** Find the value of $e$. [2]

**(iii)** For this collision, find the ratio of the loss of kinetic energy of $A$ to the loss of kinetic energy of $B$. [3]