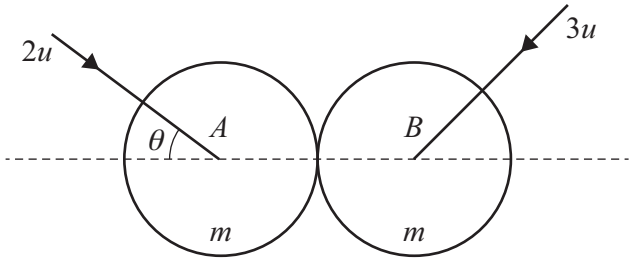
3



The diagram shows two identical smooth uniform spheres A and B of equal radii and each of mass m. The two spheres are moving on a smooth horizontal surface when they collide with speeds $2u$ and $3u$ respectively. Immediately before the collision, A's direction of motion makes an angle θ with the line of centres and B's direction of motion is perpendicular to that of A. After the collision, B moves perpendicular to the line of centres. The coefficient of restitution between the spheres is $\frac{1}{3}$.

(a) Find the value of $\tan\theta$. [3]

(b) Find the total loss of kinetic energy as a result of the collision. [2]

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(c) Find, in degrees, the angle through which the direction of motion of A is deflected as a result of the collision. [2]

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