

Three uniform small spheres A , B and C have equal radii and masses $3m$, m and m respectively. The spheres are at rest 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 . Sphere A is projected directly towards B with speed u .

(i) Find, in terms of u and e , expressions for the speeds of A , B and C after the first two collisions. [6]

(ii) Given that A and C are moving with equal speeds after these two collisions, find the value of e . [3]