A particle P is projected with speed $V\,\mathrm{m\,s^{-1}}$ at an angle $75°$ above the horizontal from a point O on a horizontal plane. It then moves freely under gravity.

(a) Show that the total time of flight, in seconds, is $\frac{2V}{g}\sin 75°$. [2]

A smooth vertical barrier is now inserted with its lower end on the plane at a distance 15 m from O. The particle is projected as before but now strikes the barrier, rebounds and returns to O. The coefficient of restitution between the barrier and the particle is $\frac{3}{5}$.

(b) Explain why the total time of flight is unchanged. [1]

(c) Find an expression for V in terms of g. [7]