

A particle P is projected from a point O on a horizontal plane and moves freely under gravity. Its initial speed is $u \text{ m s}^{-1}$ and its angle of projection is $\sin^{-1}(\frac{4}{5})$ above the horizontal. At time 8 s after projection, P is at the point A . At time 32 s after projection, P is at the point B . The direction of motion of P at B is perpendicular to its direction of motion at A .

Find the value of u .

[7]