

A particle P is projected from a point O on a horizontal plane and moves freely under gravity. The initial velocity of P is 100 ms^{-1} at an angle θ above the horizontal, where $\tan \theta = \frac{4}{3}$. The two times at which P 's height above the plane is H m differ by 10 s.

(a) Find the value of H . [5]

(b) Find the magnitude and direction of the velocity of P one second before it strikes the plane. [4]