

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

**(a)** Find the value of  $H$ .

[5]

[illegible]

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

[illegible]