The direction of motion of a projectile at a certain instant is inclined at a angle 60 to the horizontal. After root 3 second it is inclined an angle 30. The horizontal component of velocity of projectile is?

Solution

$$\alpha_1 = 60, \alpha_2 = 30, t = \sqrt{3},$$

$$\frac{v_y}{v_x} = \tan \alpha_1 , \frac{v_{y^1}}{v_x} = \tan \alpha_2 , v_{y^1} = v_y - gt$$

Then

$$v_{y^1} = v_x \tan \alpha_2 = v_x \tan \alpha_1 - gt$$

$$v_x = \frac{gt}{\tan \alpha_1 - \tan \alpha_2} = \frac{10\sqrt{3}}{\sqrt{3} - \frac{\sqrt{3}}{3}} = 15 \frac{m}{s}$$