

Answer on Question #69458-Physics / Mechanics | Relativity

Ball A is thrown upward with a speed of $u = 35\text{m/s}$ from ground, while at the same time another ball Bearing is dropped from a height of $h = 100\text{m}$ with a speed at $v = 10\text{m/s}$ along the same straight line. Find the height from the ground where the two balls meet.

Solution

The equations of motion for the balls

$$x_1 = ut - \frac{gt^2}{2},$$

$$x_2 = h - vt - \frac{gt^2}{2}.$$

At the meet point

$$x_1 = x_2$$

So

$$ut - \frac{gt^2}{2} = h - vt - \frac{gt^2}{2},$$

$$t = \frac{h}{u - v} = \frac{100}{35 - 10} = 4 \text{ s.}$$

The height from the ground where the two balls meet is

$$x_1(t) = x_2(t) = 35 \times 4 - \frac{9.8 \times 4^2}{2} = 61.6 \text{ m.}$$

Answer: 61.6 m

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