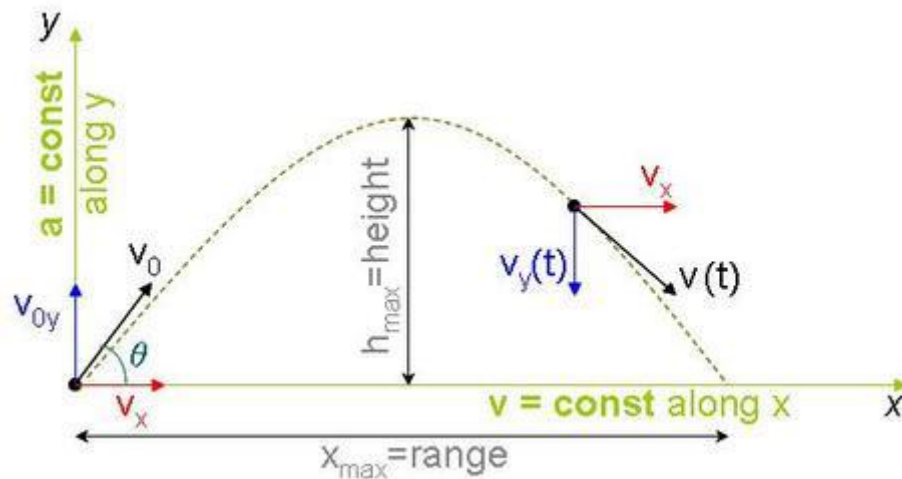# Answer on Question #71524, Physics / Mechanics | Relativity

A ball is thrown with a velocity of 10 m/sec at 35°. How far will the ball travel horizontally?

Solution:

Projectile motion is a form of motion in which an object or particle (called a projectile) is thrown near the earth's surface, and it moves along a curved path under the action of gravity only.

In projectile motion, the horizontal motion and the vertical motion are independent of each other; that is, neither motion affects the other.

The horizontal component of the velocity of the object remains unchanged throughout the motion. The vertical component of the velocity increases linearly, because the acceleration due to gravity is constant (g=9.8 m/s²).

$$v_x = v_0 \cos \alpha$$
$$v_{0y} = v_0 \sin \alpha$$

Equation related to trajectory motion is given by

$$\text{Horizontal range,} \quad R = x_{max} = \frac{v_0^2 \sin 2\theta}{g}$$

Thus,

$$R = \frac{(10\ m/s)^2 \times \sin(2 \times 35°)}{9.8\ m/s^2} = 9.59\ \text{m} \approx 9.6\ \text{m}$$

Answer: $9.59\ \text{m} \approx 9.6$ m.