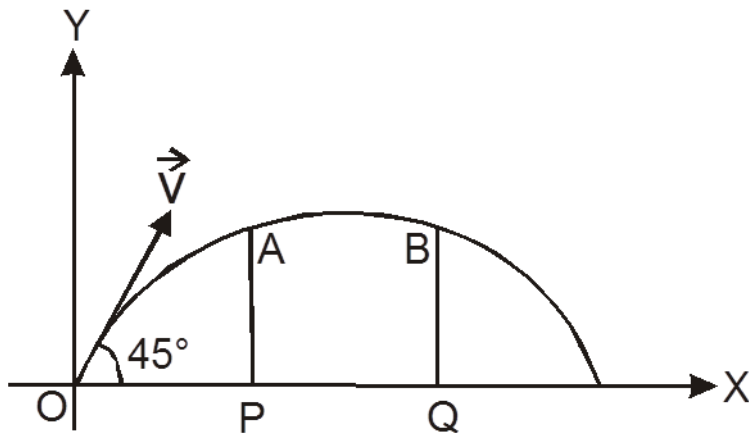**Answer on Question #60387-Physics-Mechanics-Relativity**

A ball is thrown with a velocity of 7 root 2 m/s at an angle of 45 degree with the horizontal. It just clears two vertical poles of height 90 cm. Find the separation between the poles. Take g =9.8

Solution

Let t be the time after which the ball is at the top of the poles.

$$y(t) = 0.9 \, m$$

$$v_y(0) = v \, sin45º = 7\sqrt{2} \, \frac{1}{\sqrt{2}} = 7\frac{m}{s}.$$

Now,

$$y(t) = v_y(0)t + \frac{a_y t^2}{2}$$

$$0.9 = 7t - (9.8)t^2$$

$$4.9t^2 - 7t + 0.9 = 0$$

On solving, we get

$$t_1 = \frac{1}{7}s \text{ and } t_2 = \frac{9}{7}s.$$

Hence the ball is at A after $\frac{1}{7}$ s and at B after $\frac{9}{7}$ s.

$$OP = v_x t_1 = 7\frac{1}{7} = 1\, m$$

$$OQ = v_x t_2 = 7\frac{9}{7} = 9\, m$$

$$PQ = 9 - 1 = 8\, m$$