

## Answer on Question 50658, Physics, Mechanics | Kinematics | Dynamics

### Question:

A ball is thrown upward. At what height its kinetic energy will be twice of its potential energy?

### Solution:

By the definition of the law of conservation of energy, when the ball is just begin to move upward we have:

$$E = PE + KE = 0 + \frac{1}{2}mv_0^2,$$

where  $m$  is the mass of the ball,  $v_0$  is the initial velocity of the ball.

From the condition of the question we know that when the ball reaches a certain height its kinetic energy will be twice of its potential energy:

$$\frac{1}{2}mv^2 = 2mgh.$$

Therefore, we can find the height from the law of conservation of energy:

$$0 + \frac{1}{2}mv_0^2 = mgh + \frac{1}{2}mv^2,$$

$$\frac{1}{2}mv_0^2 = mgh + 2mgh,$$

$$\frac{1}{2}mv_0^2 = 3mgh,$$

$$h = \frac{v_0^2}{6g} = \frac{1}{3} \frac{v_0^2}{2g} = \frac{1}{3}H, \text{ where } H = \frac{v_0^2}{2g} \text{ is the maximum height reached by the ball.}$$

### Answer:

$$h = \frac{1}{3}H.$$