## Answer on Question 63101, Physics, Mechanics

## Question:

A ball is thrown vertically upwards from the top of the tower with a speed of $40 \mathrm{~m} / \mathrm{s}$ returns back to ground level in 10 s . What is the height of the tower?

## Solution:

Let's take the upwards as the positive direction. Then, we can find the height of the tower from the kinematic equation:

$$
h=v_{0} t+\frac{1}{2} g t^{2},
$$

here, $h$ is the height of the tower, $v_{0}$ is the initial velocity of the ball, $g=-9.8 \mathrm{~m} / \mathrm{s}^{2}$ is the acceleration due to gravity, $t$ is the time of flight.

Finally, we can calculate the height of the tower:

$$
h=v_{0} t+\frac{1}{2} g t^{2}=40 \frac{\mathrm{~m}}{\mathrm{~s}} \cdot 10 s+\frac{1}{2} \cdot\left(-9.8 \frac{\mathrm{~m}}{\mathrm{~s}^{2}}\right) \cdot(10 \mathrm{~s})^{2}=-90 \mathrm{~m} .
$$

The sign minus appears here because we take the upwards as the positive direction. So, the height of the tower is 90 m .

## Answer:

$h=90 \mathrm{~m}$.

