Answer on Question 68331, Physics, Mechanics | Relativity

Question:

If you launch a ball up in the air at $50\ m/s$ how many seconds will it go up in the air before it starts to fall down?

Solution:

We can find how many seconds the ball needs to go up in the air before it starts to fall down from the kinematic equation:

$$v = v_0 + at,$$

here, $v_0 = 50\ m/s$ is the initial velocity of the ball, $v = 0\ m/s$ is the final velocity of the ball at the maximum height before it starts to fall down, $a = -g = -9.8\ m/s^2$ is the gravitational acceleration directed downward and t is the time.

Then, we get:

$$0 = v_0 - gt,$$

$$v_0 = gt,$$

$$t = \frac{v_0}{g} = \frac{50\ \frac{m}{s}}{9.8\ \frac{m}{s^2}} = 5.1\ s.$$

Answer:

$t = 5.1\ s.$