Answer on Question 62464, Physics, Solid State Physics

Question:

A window washer drops a brush from a scaffold on a tall office building. What is the speed of the falling brush after $3.08\ s$? (Neglect drag forces.) The acceleration due to gravity is $9.8\ \frac{m}{s^2}$. Answer in units of $\frac{m}{s}$.

Solution:

We can find the speed of the falling brush after $3.08\ s$ from the kinematic equation:

$$v = v_0 + at,$$

here, v_0 is the initial speed of the falling brush, t is the time, $a = g = 9.8\ \frac{m}{s^2}$ is the acceleration due to gravity (we take the downwards to be the positive direction, thus the acceleration due to gravity will be positive).

Since initially the brush was at rest, $v_0 = 0\ \frac{m}{s}$, and we get:

$$v(3.08\ s) = gt = 9.8\ \frac{m}{s^2} \cdot 3.08\ s = 30.18\ \frac{m}{s}.$$

Answer:

$v(3.08\ s) = 30.18\ \frac{m}{s}.$