

Answer on Question #52582-Physics-Mechanics-Kinematics-Dynamics

A parachutist drops freely from an airplane for 10 sec before the parachute opens out. Then he descends with a net retardation of 25 m/s^2 . If he bails out of the plane at a height of 2495 m and $g = 10\text{ m/s}^2$, his velocity on reaching the ground will be...

Solution

The velocity of the parachutist at the end of 10 seconds is $10g = 100\frac{\text{m}}{\text{s}}$ and the distance fallen in 10 seconds is $\frac{v^2}{2g} = \frac{100^2}{2 \cdot 10} = 500\text{ m}$. The distance travelled after he bails out is

$$s = 2495 - 500 = 1995\text{ m}.$$

For this distance $u = 100\frac{\text{m}}{\text{s}}$ and $a = -2.5\frac{\text{m}}{\text{s}^2}$. Therefore, the final velocity v is given by

$$v^2 - u^2 = 2as;$$

$$v^2 = u^2 + 2as = 100^2 - 2 \cdot 2.5 \cdot 1995$$

Which gives $v = 5\frac{\text{m}}{\text{s}}$.

Answer: $v = 5\frac{\text{m}}{\text{s}}$.