

Answer on Question 48073, Physics, Mechanics | Kinematics | Dynamics

Question:

A skydiver jumps from a helicopter hovering at high altitude. Neglecting air resistance, how fast will she be falling 12s. after jumping? How far will she have fallen? What is her average velocity?

Solution:

For the case of object falling without air resistance we have:

$$v_{fall} = g \cdot t + v_0, v_0 = 0$$

$$\text{So, } v_{fall} = g \cdot t = \left(9.8 \frac{m}{s^2}\right) \cdot 12s = 117.6 \frac{m}{s}$$

To find how far will she fallen we use another formula:

$$y = \frac{1}{2} \cdot g \cdot t^2 + v_0 \cdot t + y_0, v_0 = 0, y_0 = 0$$

$$\text{So, } y = \frac{1}{2} \cdot 9.8 \frac{m}{s^2} \cdot (12s)^2 = 705.6m$$

And finally we obtain average velocity:

$$v_{avr} = \frac{y}{t} = \frac{705.6}{12} = 58.8 \frac{m}{s}$$

Answer:

$$v_{fall} = 117.6 \frac{m}{s}$$

$$y = 705.6m$$

$$v_{avr} = 58.8 \frac{m}{s}$$