

Answer on Question #44210, Physics, Mechanics | Kinematics | Dynamics

what is the acceleration of two falling sky divers (mass 132 kg including parachute) when the upward force of air resistance is equal to one fourth of their weight?

Solution:

The problem reduces to Newton's second law, where superposition of gravity F_g and resistance F_r plays the role of the accelerating force.

These forces are directed opposite one another :

$$F = F_g - F_r = F_g - F_g * \frac{1}{4} = \frac{3}{4}F_g = \frac{3}{4}mg$$

Where g is acceleration of free fall, m is mass of sky divers.

Then Newton's second law give :

$$F = ma \rightarrow a = \frac{F}{m} = \frac{3}{4}g \approx 7.5m/s$$

(in meaning $g \approx 10 \text{ m/s}$)