Answer on Question 49945, Physics, Mechanics | Kinematics | Dynamics

Question:

A bird flying at a height of $40m$ with a speed of $10\dfrac{m}{s}$ drops a small fruit from its mouth. It free fall is assumed, find the speed of the fruit just before it reaches the ground.

Solution:

Let's find the y-component of velocity of the bird:

$$v_y^2 = v_{0y}^2 + 2gh,$$

$$v_y = \sqrt{2gh} = \sqrt{2 \cdot 9.8\frac{m}{s^2} \cdot 40m} = 28\frac{m}{s}.$$

Therefore, the speed of the fruit just before it reaches the ground will be:

$$v = \sqrt{v_x^2 + v_y^2} = \sqrt{\left(10\frac{m}{s}\right)^2 + \left(28\frac{m}{s}\right)^2} = 29.73\frac{m}{s}.$$

Answer:

$v = 29.73\dfrac{m}{s}.$