Answer on Question#40815 – Physics – Mechanics

A 65 kg sprinter completes a 100 m race in 9.83 s. Calculate the average kinetic energy of the sprinter

Solution:
$m = 65kg -$ mass of the sprinter
$S = 100m -$ traveled distance;
$t = 9.83 -$ the time required to cover the distance;
First we need to determine the average velocity of the sprinter:

$$v_a = \frac{S}{t} \quad (1)$$

Formula for the kinetic energy:

$$E_k = \frac{mv_a^2}{2} \quad (2)$$

$$(1)in(2):$$

$$E_k = \frac{m\left(\frac{S}{t}\right)^2}{2} = \frac{65kg \cdot \left(\frac{100m}{9.83s}\right)^2}{2} = 3363 \text{ J}$$

Answer: average kinetic energy of the sprinter is equal to 3363 J.