Answer on Question 49698, Physics, Mechanics | Kinematics | Dynamics

Question:

The dinosaur Tyrannosaurus rex is thought to have had a mass of about 7000kg.
a) treat the dinosaur as a particle and estimate its kinetic energy at a walking speed of 4.0 km/h
b) with what speed would a 70 kg person have to move to have the same kinetic energy as a walking T-rex?

Solution:

a) By the definition of the kinetic energy we have:

$$K.E. = \frac{1}{2}mv^2 = 0.5 \cdot 7000kg \cdot \left(4 \cdot \frac{1000m}{3600s}\right)^2 = 4320J.$$

b) From the formula for kinetic energy we can obtain the speed:

$$v = \sqrt{\frac{2K.E.}{m_{person}}} = \sqrt{\frac{2 \cdot 4320J}{70kg}} = 11.1\frac{m}{s}.$$

Answer:

a) $K.E. = 4320J.$

b) $v = 11.1\frac{m}{s}.$