Answer on Question #58749, Physics / Mechanics | Relativity

A powerful motorcycle can accelerate from rest to 26.8 m/s (100 km/h) in only 3.90 s.

(a) What is its average acceleration?

(b) How far does it travel in that time?

Solution:

(a) Average acceleration is the rate at which velocity changes. Average acceleration is the change in velocity divided by an elapsed time.

$$\overline{a} = \frac{\text{Change in velocity}}{\text{Time interval}}$$

$$\overline{a} = \frac{26.8\ \text{m/s}}{3.90\ \text{s}} = 6.87\ \text{m/s}^2$$

(b) The distance is

$$d = v_0 t + \frac{at^2}{2}$$

where v_0=0 is the initial velocity.

Hence,

$$d = \frac{at^2}{2} = \frac{6.87 \cdot 3.90^2}{2} = 52.25\ \text{m}$$

Answer. (a) $6.87\ \text{m/s}^2$; (b) $52.25\ \text{m}$.