

Answer on Question #52561, Physics, Other

An airplane accelerates down a runway at 3.20 m/s^2 for 32.8 s until it finally lifts off the ground. Determine the distance traveled before take off

Solution:

The kinematic equation of moving on the ground is

$$x = x_0 + v_0 t + \frac{1}{2} a t^2$$

where

$x_0 = 0$ is initial position

$v_0 = 0 \text{ m/s}$ is initial speed

$a = 3.20 \text{ m/s}^2$ is acceleration

$t = 32.8 \text{ s}$ is time

x = distance travelled

Thus,

$$x = \frac{1}{2} * 3.20 * 32.8^2 = 1721.3 \text{ m}$$

Answer: 1721.3 m