

Answer on Question #38462, Physics, Mechanics

Question:

A cyclist accelerates from rest to 5 m/s in 10 seconds. Later, he travels at a constant speed for another 20 seconds before coming to a complete stop in 5 seconds. What is the total distance travelled by the cyclist?

Answer:

1. Acceleration:

Distance travelled equals:

$$l_a = \frac{vt_a}{2}$$

where t_a is time of acceleration, v maximum speed

2. Uniform motion:

Distance travelled equals:

$$l_u = v * t_u$$

t_u – time of uniform motion

3. Deceleration

Distance travelled equals:

$$l_d = \frac{vt_d}{2}$$

Total distance:

$$l = l_a + l_u + l_d = v \left(\frac{t_a}{2} + t_u + \frac{t_d}{2} \right) = 5 \left(\frac{10}{2} + 20 + \frac{5}{2} \right) = 137.5 \text{ m}$$

Answer: 137.5 m