A train starting from rest picks up a speed of 20m/s in 200 seconds. It continues to move at the same speed for the next 500 seconds. It is then brought to rest next 100 seconds.
b) Calculate the rate of uniform acceleration.
c) Calculate the distance covered by the train during retardation
d) Calculate the average speed during retardation.

Solution:

Let:

$v0 = 0$

$v1 = 20m/s$

$t1 = 200sec$

$t2 = 500sec$

$t3 = 100sec$

b)

$$a = \frac{v1-v0}{t1} = \frac{20}{200} = 0.1m/sec^2$$

c)

$$S = v1 * t3 + \frac{a1*(t3)^2}{2} = v1 * t3 + \frac{\frac{v0-v1}{t3}*(t3)^2}{2} = v1 * t3 - \frac{1}{2}v1 * t3 = \frac{1}{2}v1 * t3$$

$$S = \frac{1}{2}20 * 100 = 1000m$$

d)

$$v(average) = \frac{v1-v0}{2} = \frac{20}{2} = 10m/sec$$

Answers:

b) 0.1 m/sec^2

c) 1000 m

d) 10 m/sec