Question#11369

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.
1. plot a speed time graph
2.calculate the rate of uniform acceleration.
3.calculate the distance covered by the train during retardation
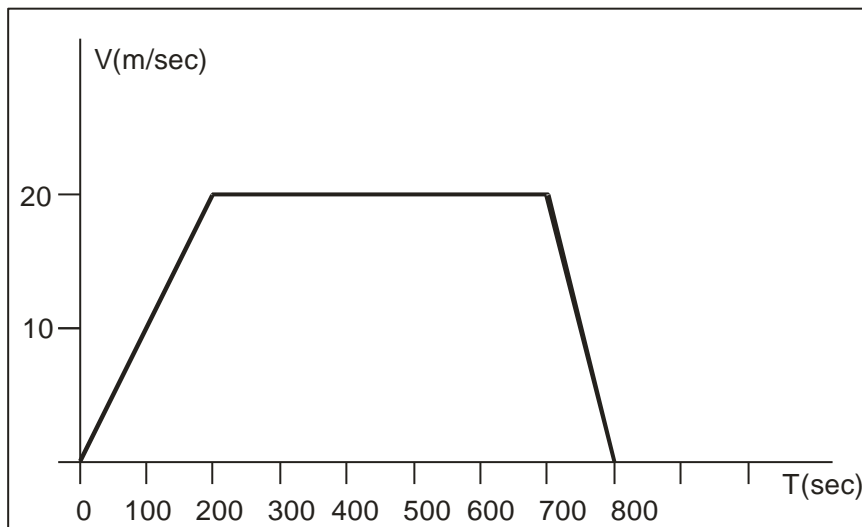4. calculate the average speed during retardation.

Solution:

Let:

$v0 = 0$

$v1 = 20m/s$

$t1 = 200sec$

$t2 = 500sec$

$t3 = 100sec$

1

2.

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

3.

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

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

4.

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