STRAWBERRY

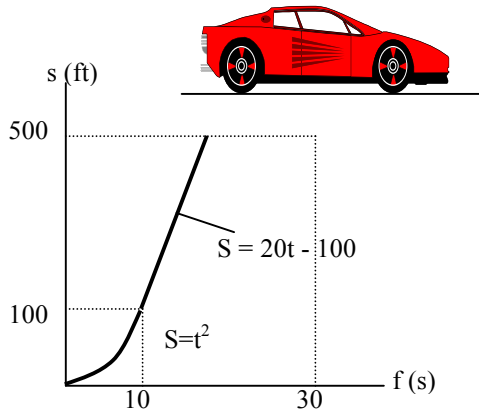[facebook] /strawberrydevelopers

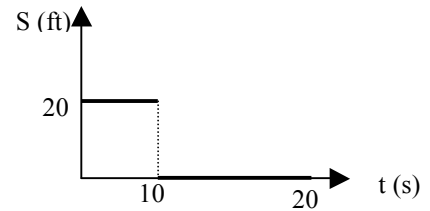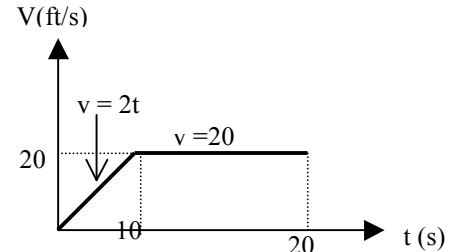[twitter] /strawberry_app

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KINEMATICS OF PARTICLES

1. **A car moves along a straight road such that its position is described by the graph shown in figure. Construct the v-t and a-t graphs for the time period $0 \leq t \leq 30s$.**

s (ft)

500

$S = 20t - 100$

100

$S = t^2$

f (s)

10   30

Answer diagrams

V(ft/s)

v = 2t

20   v = 20

10   20   t (s)

S (ft)

20

10   20   t (s)

a (m/s²)

10

A_1

10   A_2 t (s)

-2

2. **The rocket sled in figure starts from rest and travels along a straight track such that it accelerates at a constant rate for 10 sec. And then decelerates at a constant rate. Draw the v - t and s - t graphs and determine the time t' needed to stop the sled. How far has the sled travelled?**
   **Ans.: t' = 60s , s = 3000m**
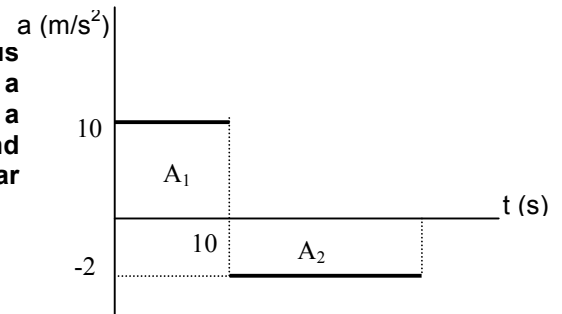
3. **The v - t graph of motion of a train as it moves from station A to station B is shown. Draw the a-t graph and determine the average speed and the distance between the stations.**
   **Ans.: s = 3600m**

4. **A dragster starting from rest travels along a straight road and for 10sec has an acceleration as shown in the figure. Construct the v - t graph that describes the motion and find the distance travelled in 10sec.**
   Ans. : 114m

a (m/s²)

$a = 1/6 \, t^2$

6

6   10   t (s)
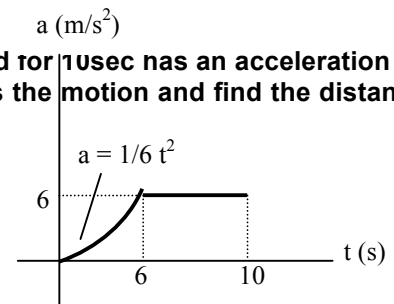
5. **A two stage rocket is fired vertically from rest with an acceleration of as shown. After 15 sec the first stage A burns out and the second stage B ignites. Plot the v - t and s - t graphs which describes the motion of the second stage for $0 \le t \le 40s$.**
   Ans.; t = 15s, v = 112.5m/s, s = 562.5 m ; t = 40s , v = 612.5m/s, s = 9625 m.
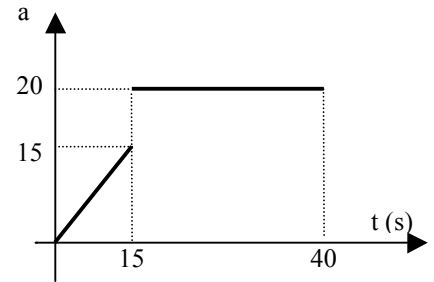
6. **For the acceleration-time diagram of a particle shown in Fig. calculate velocity at the end of 3 sec. and distance**
   traveled in 4 sec.   (T)
   Ans. : 0.5 m/s and 2 m
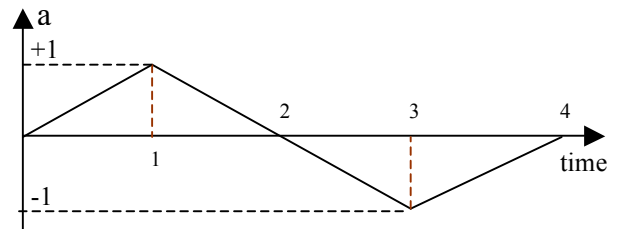
7. **A table fan rotating at a speed of 2400 rpm. is switched off and the resulting variation of rpm. with time is as shown in sketch. Determine the total number of revolutions the fan has made in 25 seconds when it finally comes to rest.**
   Ans : 408.33 revolution