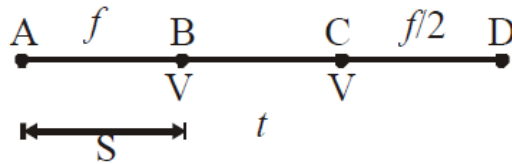


## Answer on Question #42099, Physics, Mechanics | Kinematics | Dynamics

A car starting from rest accelerates at the rate  $f$  through a distance  $s$  then continues at constant speed for time  $t$  and then decelerates at the rate  $f/2$  to come to rest. If the total distance traversed is  $15s$  then find  $s$ .

**Solution:**



The distance at first segment is

$$S_1 = S = \frac{v^2}{2a_1} = \frac{v^2}{2f}$$

The distance at second segment is

$$S_2 = BC = vt$$

The distance at third segment is

$$S_3 = CD = \frac{v^2}{2a_2} = \frac{v^2}{f} = 2S$$

Thus,

$$S_2 = 15S - [AB + CD] = 15S - S - 2S = 12S$$

$$S = \frac{vt}{12} = \frac{v^2}{2f}$$

So,

$$v = \frac{2ft}{12} = \frac{ft}{6}$$

Thus,

$$S = \frac{ft}{6} \frac{t}{12} = \frac{f}{72} t^2$$

**Answer.**  $S = \frac{f}{72} t^2$