Answer on Question #43335, Physics, Mechanics | Kinematics | Dynamics

A car accelerates from rest at a constant rate 'A' for some time after which it decelerate at a constant rate 'B' and comes to rest. If total time elapsed is 't' then maximum velocity acquired by car will be.?

Solution:

For the first period of motion the acceleration is

$$a_1 = A = \frac{v - v_0}{t_1} = \frac{v}{t_1}$$

$$t_1 = \frac{v}{A}$$

For the second period of motion the acceleration is

$$a_2 = -B = \frac{0 - v}{t_2} = -\frac{v}{t_2}$$

$$t_2 = \frac{v}{B}$$

From given

$$t = t_1 + t_2 = \frac{v}{A} + \frac{v}{B} = v\left(\frac{1}{A} + \frac{1}{B}\right) = v\frac{A + B}{AB}$$

Thus,

$$v = \frac{AB}{A + B}t$$

Answer: $v = \frac{AB}{A+B}t$