Question#19300

two cars travelling towards each other on a straight road at velocity 10 m/s and 12 m/s respectively.when they are 150 m apart,drivers apply their brakes and each can decelerate at 2 m/s until it stops.how far apart will they be when they have both come to stop?

Solution:

Let:

V_1=10 m/s

V_2=12 m/s

S_0=150 m

a=2 m/s^2

S - ?

$S=S_0+S_1+S_2$, were S1, S2 brake distance of the cars.

$S_1=1/2at^2$, were t - time of brakes

Such $V_1=at$, $t=V_1/a$;

$S_1=V_1^2/2a$;

$S2=V_2^2/2a$;

$S=S_0+(V_1^2+V_2^2)/2a$

$S=150+(10^2+12^2)/2*2=211$ m

Answer: 211 m.