

Car A starts from rest at $t = 0$ and travels along a straight road with a constant of 2 m/s^2 until it reaches a speed of 27 m/s . Afterwards it maintains this speed. Also, when $t = 0$, car B located 2000 m down the road is travelling towards A at a constant speed of 20 m/s . Determine the distance travelled by car A when they pass each other. (ans: 1097.3 m).

Solution

$$S_A = \frac{at_1^2}{2} + V_A t$$

$$S_B = V_B(t_1 + t)$$

$$V_A = at_1 \gg t_1 = \frac{V_A}{a}$$

$$S = S_A + S_B$$

$$S_A = \frac{V_A^2}{2a} + V_A t; S_B = V_B \left(\frac{V_A}{a} + t \right).$$

$$S = \frac{V_A^2}{2a} + V_A t + \frac{V_B V_A}{a} + V_B t. \gg t = \frac{S - \frac{V_A^2}{2a} - \frac{V_B V_A}{a}}{V_A + V_B} = \frac{2000 - \frac{27^2}{4} - \frac{20 * 27}{2}}{27 + 20}$$

$$= 32.9 \text{ s}$$

$$S_A = \frac{at_1^2}{2} + V_A t = \frac{2 * \left(\frac{27}{2}\right)^2}{2} + 27 * 32.9 = 1071 \text{ m}$$

We think that your answer is not correct.