

Question #34331

a vehicle of mass 120kg is moving with a velocity of 90kmph what fore should be applied on the vehicle to stop it in 5 s

Solution

Let:

$$m = 120 \text{ kg}$$

$$v_0 = 90 \text{ km/h} = 25 \text{ m/s}$$

$$t = 5 \text{ s}$$

$$F = ?$$

At the equally decelerated motion of the vehicle

$$v = v_0 - at \text{ where } a \text{ is the acceleration due the force } F$$

According to the second Newton's law

$$a = \frac{F}{m}$$

$$v = v_0 - \frac{F}{m}t$$

Such as the final velocity is equal to zero

$$v_0 = \frac{F}{m}t$$

$$F = \frac{v_0 m}{t}$$

$$F = \frac{25 \cdot 120}{5} = 600 \text{ N}$$

Answer: 600 N.