

Given:-

The mass of Automobile = 1500 Kg

Angle ( $\theta$ ) =  $90^\circ$

Initial velocity (U) = 8 m/s

Time taken (t) = 3 sec.

Now,

Consider the east direction as x-axis then

Initial velocity (U) = 8 m/s (i) in east-direction

Final velocity (v) = 8 m/s (j) in north- direction

A) Find the impulse delivered to the car as a result of the turn

Impulse (I) = Change in momentum

$$\text{_____} = m (v - u)$$

$$\text{Impulse (i)} = m \left( 8 \frac{m}{s} i - \frac{8m}{s} j \right)$$

$$\text{The magnitude of the impulse is ( I )} = m \times \sqrt{8^2 + 8^2}$$

$$= 1500 \times 11.313$$

$$= 16970.56 \text{ Kg. m/s (North - south direction)}$$

B) Find the average force exerted on the car during the turn .

$$\text{The average force (F)} = \frac{I}{t}$$

$$= \frac{16970.56}{3}$$

$$= 5656.85 \text{ N}$$

C) Find the average force exerted on the car on the road during the turn .

The average force applied by the car on the road = Force applied by the road on the car

So, Average force = 5656.85 N.