

Answer on Question#37750 - Physics - Other

A carnival ride the passengers travel at constant speed in a circle of radius 5cm. they make 1 complete circle in 4seconds.what is their acceleration ?

Solution:

There is no linear (tangential) acceleration as passengers are traveling at "constant speed."

$$\text{Speed} = \frac{\text{Distance}}{\text{time}}; v = \frac{2\pi \cdot R}{t}$$

$$\text{Centripetal acceleration : } a = \frac{v^2}{R} = \frac{4\pi^2 R^2}{t^2 \cdot R} = \frac{4\pi^2 R}{t^2} = \frac{4\pi^2 \cdot 0.05\text{m}}{(4\text{s})^2} = 0.123 \frac{\text{m}}{\text{s}^2}$$

Centripetal acceleration, directed towards the centre of the circle (inwards).

Answer: Centripetal acceleration is equal to $0.123 \frac{\text{m}}{\text{s}^2}$.