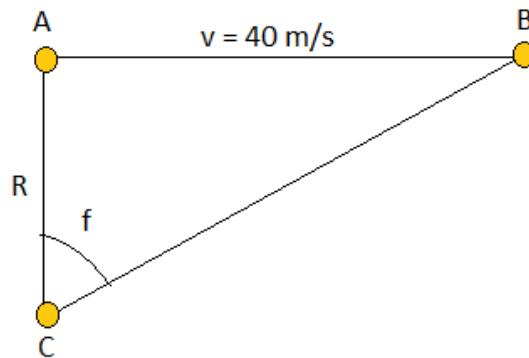


Answer on Question #65091, Physics / Mechanics | Relativity

A racing car is travelling along a straight track at a constant velocity of 40 m/s. A fixed TV camera is recording the event as shown in figure. In order to keep the car in view, in the position shown, the angular velocity of camera should be.

Solution:



$$\tan(f) = AB/AC$$

$$AB = AC \times \tan(f)$$

Where, $AC = R = 30 \text{ m}$, $f = 30^\circ = 0.5 \text{ rad}$

$$\tan 30^\circ = 0.577$$

$$AB = 30 \text{ m} \times 0.577 = 17.31 \text{ m}$$

$$v = s/t$$

$$t = s/v = 17.31 \text{ m} / 40 \text{ ms}^{-1} = 0.43 \text{ s}$$

$$\omega = f/t = 0.5 \text{ rad} / 0.43 \text{ s} = 1.16 \text{ rad/s} \sim 1 \text{ rad/s}$$

Answer: 1 rad/s

Answer provided by <https://www.AssignmentExpert.com>