Answer on Question #60208, Physics / Mechanics | Relativity

A stone tied to the end of 20 cm long string is whirled in a horizontal circle. If the centripetal acceleration is 9.8 ms-2, its angular speed in radian per sec is :

Find: ω – ?

Given:

r=0,2 m

a_c=9,8 m/s^2

Solution:

The relationship between linear velocity v and cyclic velocity ω:

$v = \omega r$ (1),

where r – radius of the circle

Of (1) $\Rightarrow$ $\omega = \frac{v}{r}$ (2)

Centripetal acceleration:

$a_c = \frac{v^2}{r}$ (3)

Of (3) $\Rightarrow$ $v = \sqrt{a_c r}$ (4)

(4) in (2): $\omega = \sqrt{\frac{a_c}{r}}$ (5)

Of (5) $\Rightarrow$ ω=7 rad/s

Answer:

7 rad/s