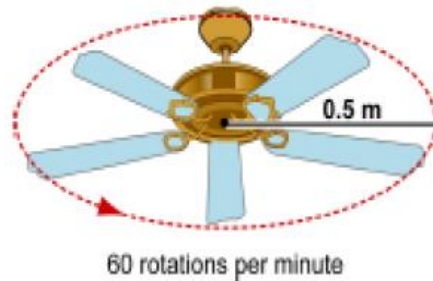


Answer on Question #42239, Physics, Mechanics | Kinematics | Dynamics

The blades on a ceiling fan spin at 60 rotation per minute as shown in the figure below. The fan has a radius of 50cm. Calculate the linear speed of a point at the outer edge of a blade in meter per second.



Solution:

Given:

$$f = 60 \text{ rpm},$$

$$R = 50 \text{ cm} = 0.5 \text{ m},$$

$$v = ?$$

Rotations per minute (abbreviated rpm) are a measure of the frequency of a rotation. It annotates the number of turns completed in one minute around a fixed axis.

We have

$$f = 60 \text{ rpm} = \frac{60 \text{ rotation}}{60 \text{ s}} = 1 \text{ Hz}$$

Linear speed = radius \times angular speed

$$v = R\omega$$

The conversion between a frequency f measured in hertz and an angular speed ω measured in radians per second are:

$$\omega = 2\pi f$$

Thus,

$$v = R\omega = 2\pi fR = 2 \cdot 3.14 \cdot 1 \cdot 0.5 = 3.14 \text{ m/s}$$

Answer. $v = 3.14 \text{ m/s}$.