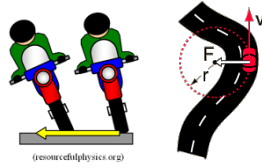


Centripetal Force

Centripetal Force

Objectives

Define & calculate the centripetal acceleration and centripetal force of an object and tell the direction in which each acts.

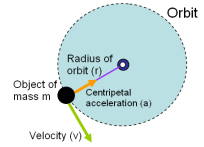


Centripetal Acceleration

measures how quickly the direction of velocity changes.

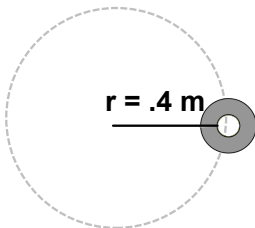
$$a_c = \frac{v_t^2}{r}$$

Unit: m/s²



can be compared to 9.8 m/s² (1 g)

Centripetal Acceleration



rev = 10
t = 5 sec

$$v_t = ? \quad \frac{2\pi r (\# \text{ revs})}{t}$$

$$\frac{2\pi (.4 \text{ m})(10 \text{ revs})}{5 \text{ sec}} = \boxed{5 \frac{\text{m}}{\text{s}}}$$

$$a_c = ? \quad \frac{v_t^2}{r} = \frac{(5)^2}{.4 \text{ m}} = \boxed{63 \frac{\text{m}}{\text{s}^2}}$$

Centripetal Force

force that causes an object to go in a circle

provided by some other type of force tension, gravity, friction

direction is towards center (center seeking)

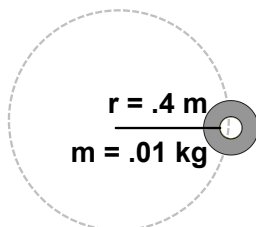
$$F_c = ma_c$$

$$F_c = \frac{m \cdot v_t^2}{r}$$



Unit: Newton (N)

Centripetal Acceleration



rev = 10
t = 5 sec

$$v_t = \frac{2\pi (.4 \text{ m})(10 \text{ rev})}{5 \text{ sec}}$$

$$v_t = 5 \text{ m/s}$$

$$a_c = \frac{(5 \text{ m/s})^2}{.4 \text{ m}}$$

$$a_c = 63 \text{ m/s}^2$$

$$F_c = ? \quad .01 \text{ kg} \cdot 63 \frac{\text{m}}{\text{s}^2}$$

$$\boxed{F_c = .63 \text{ N}}$$

Assignments . . .



- Chapter 8 Homework # 7 - 12

