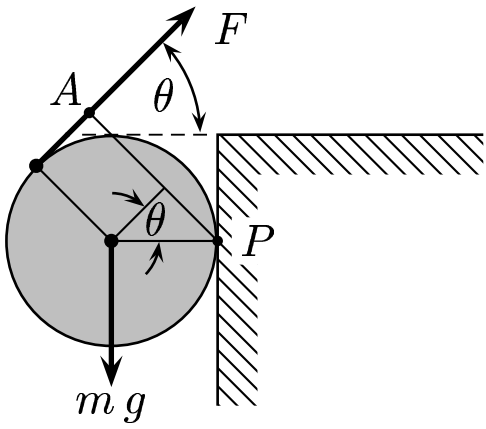


Consider a solid sphere of radius  $R$  and mass  $m$  is held against a wall by a string being pulled at an angle  $\theta$ .

Determine the torque equation about the point  $P$ .

- A)  $R m g = R F .$
- B)  $R m g = R F ( 1 + \sin \theta ) .$
- C)  $R m g = R F ( 1 + \cos \theta ) .$
- D)  $R m g = 2 R F \sin \theta .$
- E)  $R m g = 2 R F \cos \theta .$



About P, the clockwise torque is,

$$\tau_{cw} = \overline{AP} \times F,$$

where  $\overline{AP} = R(1 + \sin \theta)$  and the clockwise torque,

$$\tau_{ccw} = R m g.$$

So the equation is,  $\tau_{ccw} = \tau_{cw}$ , gives  $R m g = R F (1 + \sin \theta)$ .

Answer **B**.

12.03-06 Holding a Sphere 2004-4-7