

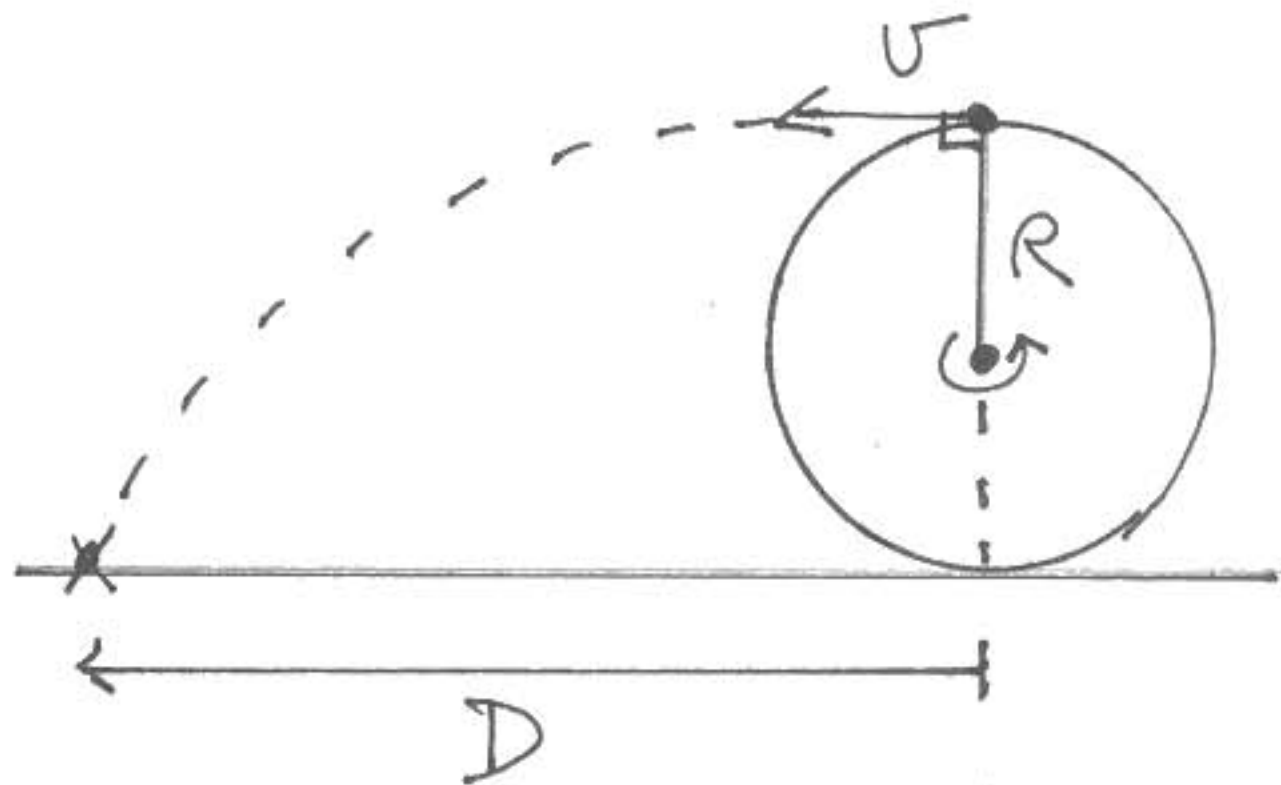
## B:(20 pts) Flywheel Projectile

A ball (the projectile) is fired from a flywheel supported on the ground as shown. The flywheel has radius  $R = 2m$ ; it spins with a period of revolution  $P = 0.2s$ . The ball is released at the very top of the rotation. What is the initial speed  $v$  of the ball, just as it is released? How long (time  $T$ ) is the ball in flight? When the ball lands, how far is it horizontally (distance  $D$ ) from the release point?

•(8pts)  $v =$  \_\_\_\_\_

•(6pts)  $T =$  \_\_\_\_\_

•(6pts)  $D =$  \_\_\_\_\_



## B:(20 pts) Flywheel Projectile

A ball (the projectile) is fired from a flywheel supported on the ground as shown. The flywheel has radius  $R = 2\text{m}$ ; it spins with a period of revolution  $P = 0.2\text{s}$ . The ball is released at the very top of the rotation. What is the initial speed  $v$  of the ball, just as it is released? How long (time  $T$ ) is the ball in flight? When the ball lands, how far is it horizontally (distance  $D$ ) from the release point?

•(8pts)  $v = \underline{62.8 \text{ m/s}}$

•(6pts)  $T = \underline{0.904 \text{ s}}$

•(6pts)  $D = \underline{56.8 \text{ m}}$

$$v = \frac{2\pi R}{P} = \underline{62.8319 \text{ m/s}}$$

• Fall time:  $2R = \frac{1}{2}gT^2$   
 $T = \sqrt{4R/g} = \underline{0.903508 \text{ s}}$

• Range:  $D = vT = \underline{56.7691 \text{ m}}$

