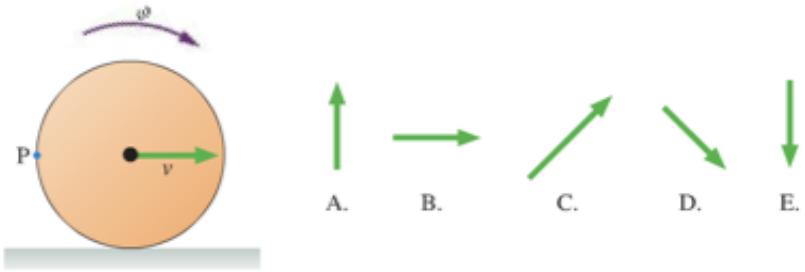
Question 1 (2 points)

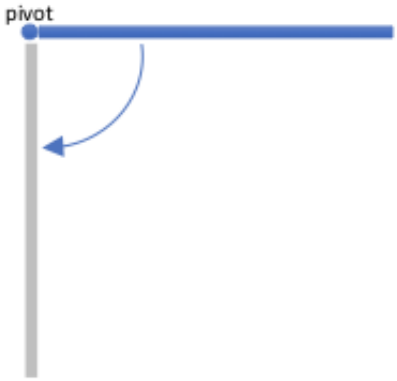
Which of these is the total velocity vector for point P on the rolling disk?



- a) A
- b) B
- c) C
- d) D
- e) E

Question 2 (2 points)

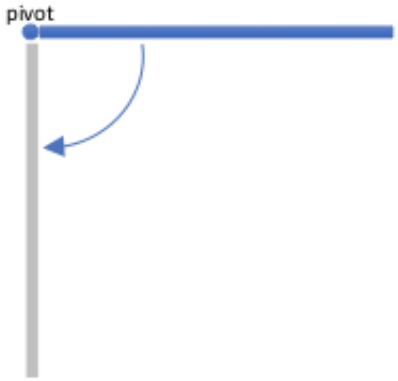
A bar is pivoted at one end and falls towards the vertical. If you were to use conservation of energy to analyze the motion, what would you use for K (total kinetic energy)?



- a) 0 at all points
- b) $\frac{1}{2}mv^2$ only
- c) $\frac{1}{2}I\omega^2$ only
- d) $\frac{1}{2}mv^2 + \frac{1}{2}I\omega^2$

Question 3 (2 points)

A uniform bar of mass m and length L is pivoted at one end falls towards the vertical. If you were to use conservation of energy to analyze the motion, what would use for the initial U_g



- a) 0
- b) mgL
- c) $mg\frac{L}{2}$
- d) $mg\frac{L}{4}$
- e) $2mgL$

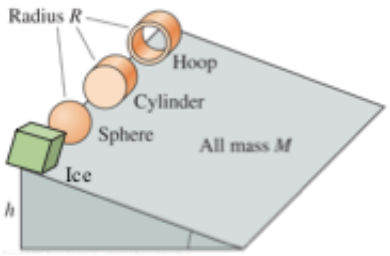
Question 4 (2 points)

Consider objects rolling down the incline. How does the angular speed relate to the speed of the center of mass?

- a) $\omega = vR$
- b) $\omega = \frac{v}{R}$
- c) $\omega^2 = \frac{v^2}{R}$
- d) $\omega = v$

Question 5 (2 points)

Three objects roll down a ramp while an ice slide down. If you were to use conservation of energy to analyze the motion of the rolling objects, what would you use for K(total)?



a) 0 all points

b) $\frac{1}{2}mv^2$

c) $\frac{1}{2}I\omega^2$

d) $\frac{1}{2}mv^2 + \frac{1}{2}I\omega^2$

Question 6 (2 points)

To analyze the motion of objects rolling down an incline, you can use conservation of energy. Say the objects starts from rest at a height h. Which of the following is the correct starting equation?

a) $mgh = \frac{1}{2}mv^2 + \frac{1}{2}I\omega^2$

b) $mgh = \frac{1}{2}mv^2$

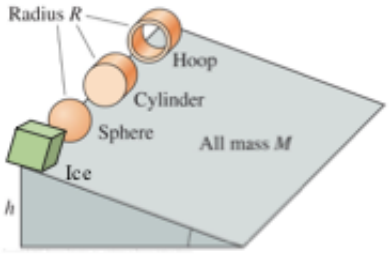
c) $mgh = \frac{1}{2}I\omega^2$

d) $0 = mgh + \frac{1}{2}mv^2 + \frac{1}{2}I\omega^2$

Question 7 (2 points)

Three objects roll down a ramp while an ice slides down. The three round objects have the same mass M and radius R. The frictionless ice cube has a mass M and length of side $2R$.

The objects roll down without slipping, and the ice cube slides without friction. They all start from rest.



Out of the ROLLING objects, which one wins the race?

- a) Solid sphere
- b) Solid cylinder
- c) Hoop
- d) There is a tie

Question 8 (2 points)

Consider the same situation as the previous problem. Out of ALL of the objects, including the ice cube, which one wins the race?

a) Solid sphere

b) Solid cylinder

c) Hoop

d) Ice cube

e) There is a tie

Question 9 (2 points)

A uniform solid sphere starts from rest and rolls down the inline of height h. What is the speed of the center of mass of the sphere at the bottom of the incline?

a) $\sqrt{\frac{10}{7}gh}$

b) $\sqrt{\frac{5}{7}gh}$

c) $\sqrt{\frac{5}{14}gh}$

d) The speed depend on the mass and the radius of the sphere

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0 of 9 questions saved