

Are You Ready for Physics AP 2?

Self-Assessment Test

1. A simple pendulum is released from rest at a small angle from the vertical. At what point in its swing is the kinetic energy of the pendulum bob at its maximum?
 - (a) At the highest point of the swing
 - (b) Halfway between the highest and lowest points
 - (c) When the acceleration of the bob is at a maximum
 - (d) At the lowest point of the swing
2. A block slides down a frictionless incline from a height h and reaches the bottom with a speed v . If the starting height is increased to $2h$, what will be the new speed of the block at the bottom?
3. If the distance between the center of two objects is halved while the mass of both objects are doubled, by what factor will the gravitational force between them be increased by?
4. A solid cylinder and a thin-walled hollow hoop of the same mass and radius are released from rest at the top of an incline. If both roll without slipping, which object reaches the bottom first?
 - (a) The solid cylinder
 - (b) The hollow hoop
 - (c) Both reach the bottom at the exact same time
 - (d) Depend on the height and angle of the incline
5. A net force of 10 N is applied to a 2 kg block initially at rest over a distance of 5 meters. What is the final kinetic energy of the block?
6. A motor lifts a 50 kg crate vertically upward at a constant speed of 2 m/s. Assuming $g = 10 \text{ m/s}^2$, what is the minimum power output required from the motor?
7. A 2 kg cart moving right at 6 m/s collides with a 4 kg cart initially at rest. If the two carts stick together upon impact, what is their final shared velocity?

8. A soccer ball was kicked with a velocity of 9.4 m/s at an angle 41° above horizontal and landed at the same level from which it was kicked. Determine the ball's maximum height and range.
9. The moon orbits the earth at a distance of $3.85 \times 10^8 \text{ m}$. The mass of the earth is $5.97 \times 10^{24} \text{ kg}$. Find the period for the moon's motion around the earth, and express your answer in days.
10. Consider the diagram below. What is the tension in Cable AB and Cable BC?

