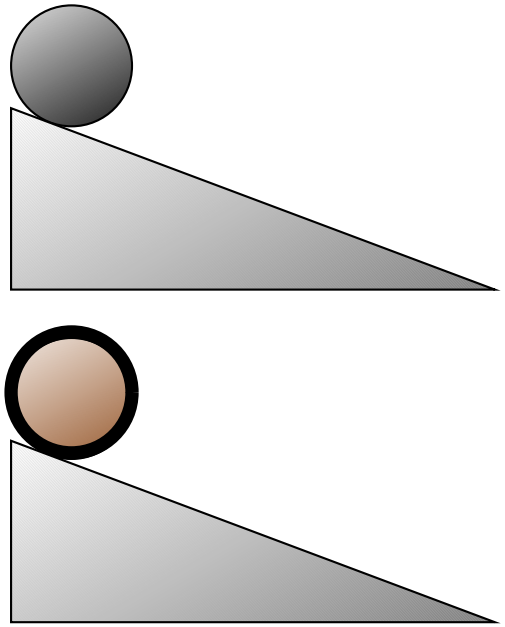
Question 1

Two circular objects with the same mass and radius are released from the same point on a ramp. In one of the objects, A, the mass is evenly distributed. In the other, B, it is concentrated at the rim.

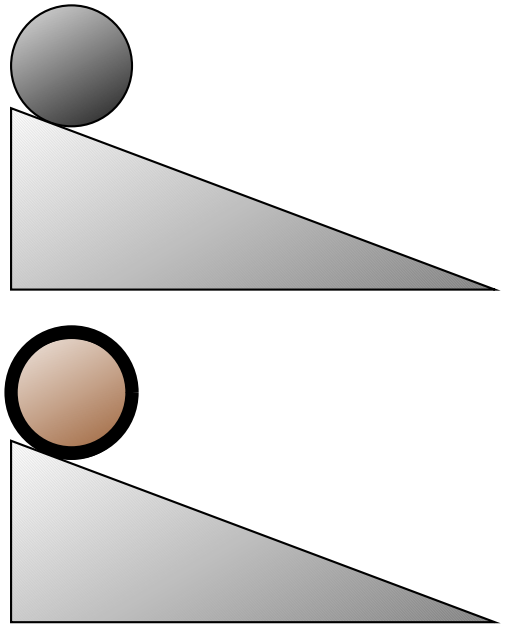


How do the moments of inertia for the objects compare?

1. $I_{\mathrm{A}} = I_{\mathrm{B}}$
2. $I_{\mathrm{A}} < I_{\mathrm{B}}$
3. $I_{\mathrm{A}} > I_{\mathrm{B}}$

Question 2

Two circular objects with the same mass and radius are released from the same point on a ramp. In one of the objects, A, the mass is evenly distributed. In the other, B, it is concentrated at the rim.



Which of the following is true regarding the speeds at the bottom of the ramp?

1. $v_{\mathrm{A}} = v_{\mathrm{B}}$
2. $v_{\mathrm{A}} < v_{\mathrm{B}}$
3. $v_{\mathrm{A}} > v_{\mathrm{B}}$

Question 3

The Hoberman sphere is initially in its "contracted" mode and set into rotation. The string is released, allowing the sphere to expand.

Which of the following is true regarding the angular velocity of the sphere as it contracts?

1. The angular velocity stays constant.
2. The angular velocity increases.
3. The angular velocity decreases.

Question 4

A toy train is on a circular track that is mounted on the edge of a wheel. The wheel is free to rotate. The train and wheel are initially at rest.

The train is set into motion. What happens to the track?

1. It remains stationary.
2. It rotates opposite to the train.
3. It rotates in the same direction as the train.