

Solid Cylinder v/s Hollow Cylinder

Solution:

The correct answer is a.)

From Question #3, we know that:
$$v = \sqrt{\frac{2gh}{1 + (I/mr^2)}} \dots (1)$$

Thus, for the solid cylinder ($I = (1/2)mr^2$), from (1),

$$v = \sqrt{\frac{4gh}{3}} = 1.1547\sqrt{gh} \dots (2)$$

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And, for the hollow cylinder ($I = mr^2$), from (1),

$$v = \sqrt{gh}$$

... (3)

Clearly, from (2) and (3), *the solid cylinder reaches the bottom faster.*