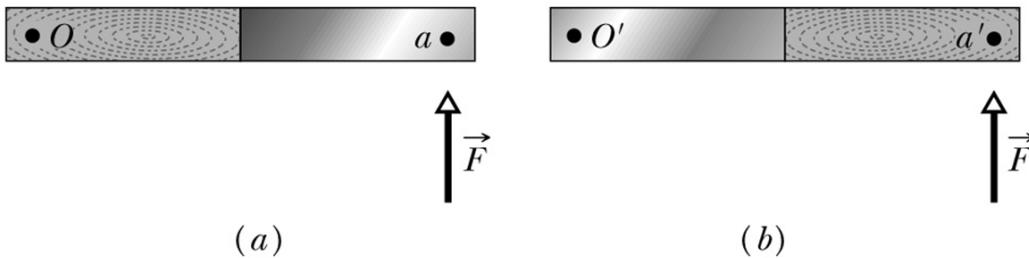


**Quiz #10: Rotation of a Rigid Body**

**Problem 1** (2 points)

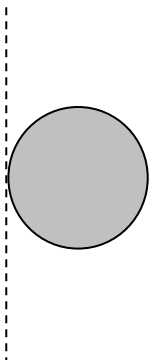
The figure below shows two overhead views of a meter stick that is lying on a frictionless surface. In figure (a), a meter stick that is half wood and half steel is pivoted at the wood end at point  $O$ . A force  $\vec{F}$  is applied to the steel end at point  $a$ . In figure (b), the stick is reversed and pivoted at the steel end at point  $O'$ , and the same force is applied at the wooden end at point  $a'$ . Is the resulting angular acceleration of figure (a) greater than, less than, or the same as that of figure (b)?



- (a) greater than
- (b) less than
- (c) the same as

**Problem 2** (3 points)

A solid sphere of mass 1.25 kg and radius 0.40 m is rotated around a vertical axis about one end (see the figure below) at an angular speed of 25.0 rev/min. What is the rotational kinetic energy of the sphere?



**Problem 3** (5 points)

In the figure below, block 2 of mass  $m_2 = 5.75$  kg rests on a surface. The coefficient of kinetic friction between block 2 and the surface is 0.45. Block 2 is attached to block 1 ( $m_1 = 3.50$  kg) by a massless, stretchless string that passes over a frictionless pulley of mass 2.0 kg and radius  $R = 15.0$  cm. What is the magnitude of the acceleration of each block and the magnitudes of  $T_1$  and  $T_2$ ? (Note: you must draw FBDs and show all work to get full credit.)

