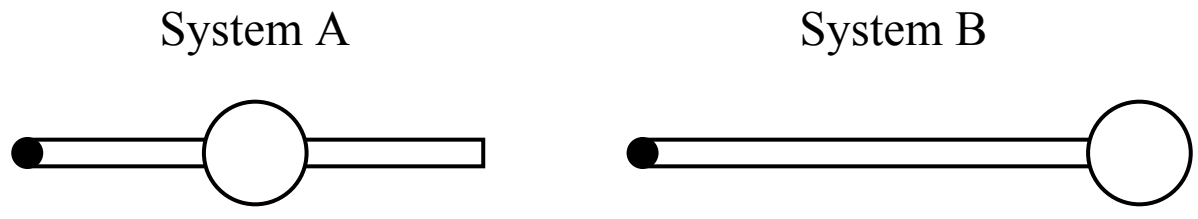
ROTATIONAL KINETIC ENERGY



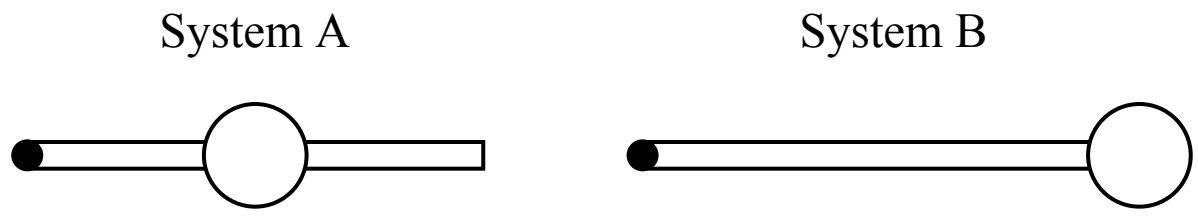
1. Two systems consist of identical rods and identical spheres which are free to rotate about the left end of the rod. The sphere in system A is located at the center of the rod, and the sphere in system B is located at the end of the rod. If torques are applied to the systems so that both systems rotate with the same angular speed, which system will have a greater rotational kinetic energy?

   (A) The systems will have the same rotational kinetic energy

   (B) System A

   (C) System B

   (D) Cannot be determined



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A Incorrect

B Incorrect

C Correct

The rotational kinetic energy of an object or system is proportional to the rotational inertia and the square of the angular speed. System B has a greater rotational inertia because mass is located farther from the point of rotation, so system B will have the grater rotational kinetic energy if the systems have the same angular speed.

$K_{\text{rot}} = \frac{1}{2} I\omega^2$

D Incorrect