**Problem Set 8 Rotation (Due 4/24/2025 before class in stapled A4-sized paper)**

**Late homework will NOT be accepted, unless you have notified the course instructor 3 days BEFORE deadline.**

**Part I (60%)**

**文本

描述已自动生成**

**日程表

低可信度描述已自动生成**

**文本

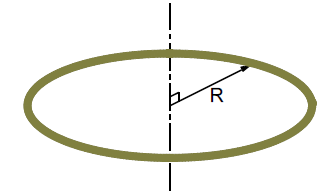
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**Part II (40%)**

1. What angle in radians is subtended by an arc 1.50 m long on the circumference of a circle of radius 2.50 m? What is this angle in degrees?
2. An arc 14.0 cm long on the circumference of a circle subtends an angle of 128 degrees. What is the radius of the circle?
3. An airplane propeller is rotating at 1900 rpm (rev/min). Compute the propeller’s angular velocity in rad/s.
4. A circular saw blade 0.200 m in diameter starts from rest. In 6.00 s it accelerates with constant angular acceleration to an angular velocity of 140 rad/s. Find the angular acceleration and the angle through which the blade has turned.

For Problems 5-6. A flywheel with a radius of 0.300 m starts from rest and accelerates with a constant angular acceleration of 0.6 rad/s2.

1. Compute the magnitude of the tangential acceleration, the radial acceleration, and the resultant acceleration of a point on its rim at the start.
2. Compute the magnitude of the tangential acceleration, the radial acceleration, and the resultant acceleration of a point on its rim after it has turned through 60.0 degrees.
3. A bowling ball of mass m and radius R is initially thrown down an alley with an initial speed v0 and it slides without rolling but due to friction it begins to roll. The moment of inertia of the ball about its center of mass is Icm = (2/5) mR². Using conservation of angular momentum about a point (you need to find that point), find the speed vf of the bowling ball when it just starts to roll without slipping?
4. What is the moment of inertia for a hoop (an infinitesimally-thin circular arc) of mass 𝑀 and radius 𝑅 rotating about its symmetry axis? Explain your answer.



1. Find the moment of inertia of a solid sphere, mass 𝑀 and radius 𝑅 about an axis of symmetry.

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1. Calculate the moment of inertia of a rod (an infinitesimally-thin line segment) of mass 𝑀 and length 𝐿, about its axis of symmetry.

图表, 箱线图

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