BitWith Bite

PHYSICS WORKSHEET

Rotational Motion

Chapter: Mechanics · Level ★★☆ · Time: 30 min

SCORE
___ / 20

Name ________________ Class ________________ Date ________________

AFTER THIS WORKSHEET YOU CAN

✓ Understand: Angular Displacement, Velocity, and Acceleration
✓ Understand: Rotational Equations of Motion
✓ Understand: Relating Linear and Angular Quantities
✓ Understand: Moment of Inertia

Section A · Concept Check

BEGINNER 4 × 1 = 4

1. A wheel accelerates from rest to 30 rad/s in 6s. Find angular acceleration.

2. A wheel of radius 0.6m spins at 15 rad/s. Find the linear speed at its rim.

3. A wheel has I=5 kg*m^2 and omega=4 rad/s. Find rotational KE.

4. A wheel starts at 5 rad/s and accelerates at 2 rad/s^2 for 3s. Find its final angular velocity.

Section B · Problem Solving

INTERMEDIATE 4 × 3 = 12

5. Using the previous wheel, find the angular displacement over those 3 seconds.

6. Why does an object's moment of inertia depend on how its mass is distributed, not just its total mass?

7. A point on a spinning disk of radius 0.3m has linear speed 6 m/s. Find the disk's angular velocity.

8. What everyday object demonstrates rotational kinetic energy?

Section C · Challenge

CHALLENGE 2 × 2 = 4

9. A wheel with I=10 kg*m^2 has rotational KE of 500 J. Find its angular velocity.

10. Why do the rotational equations of motion mirror the linear equations of motion so closely?

Reflection — the most useful thing I learned: ________________

A ___/4 B ___/12 C ___/4 **Total ___/20**

Teacher's Signature

Parent's Signature

✂ ANSWER KEY — FOLD OR CUT BEFORE HANDING OUT

1 = 5 rad/s^2 2 = 9 m/s 3 = 40 J 4 = omega=5+2*3=11 rad/s | 5 = theta=5*3+0.5*2*9=15+9=24 rad 6 = Mass farther from the rotation axis contributes more resistance to rotational change than mass close to the axis 7 = omega=v/r=6/0.3=20 rad/s 8 = Any valid example, e.g. a spinning top, a flywheel, or a rotating fan blade | 9 = 500=0.5*10*omega^2, omega^2=100, omega=10 rad/s 10 = Rotational quantities (theta, omega, alpha) are the direct rotational analogs of linear quantities (position, velocity, acceleration), following the same underlying physics