

Honors Physics Chapter 8 Study Sheet

Name _____ #: _____

1) If the torque required to loosen a nut on the wheel of a car has a magnitude of _____ **N · m**, **what minimum force** must be exerted by a mechanic at the end of a _____ **cm** wrench to loosen the nut?

Drawing **Given Info** **Formula** **Set-Up with Units**

Answer _____

2) A simple pendulum consists of a _____ **kg** point mass hanging at the end of a _____ **m** long light string that is connected to a pivot point.

a) **Calculate the magnitude of the torque** (due to the force of gravity) around this pivot point when the string makes a _____^o angle with the vertical.

Drawing **Given Info** **Formula** **Set-Up with Units**

Answer _____

3) A _____ **N** person and a _____ **N** person sit on either end of a _____ **m** long seesaw.

a) **Where along the seesaw should the pivot point be placed** to ensure rotational equilibrium?

Drawing **Given Info** **Formula** **Set-Up with Units**

Answer _____

4) A window washer weighing _____ **N** is standing on a scaffold supported by a vertical rope at each end. The scaffold weighs _____ **N** and is _____ **m** long. **What is the force in each rope** when the window washer stands _____ **m** from one end?

Drawing **Given Info** **Formula** **Set-Up with Units**

Answer _____

5) A bucket filled with water has a mass of _____ **kg** and is attached to a rope that is wound around a _____ **m** radius cylinder. **What torque** does the bucket produce around the center of the cylinder?

Drawing **Given Info** **Formula** **Set-Up with Units**

Answer _____

6) A potter's wheel of radius _____ **cm** and mass _____ **kg** is freely rotating at _____ **rev/min**. The potter can stop the wheel in _____ **s** by pressing a wet rag against the rim and exerting a radially inward force of _____ **N**.

a) **What is the angular acceleration** of the wheel?

Drawing **Given Info** **Formula** **Set-Up with Units**

Answer _____

b) **How much torque** does the potter apply to the wheel?

Drawing **Given Info** **Formula** **Set-Up with Units**

Answer _____

7) As Halley's comet orbits the sun, its distance from the sun changes dramatically, from _____ **m** to _____ **m**. If the comet's speed at closest approach is _____ **m/s**, **what is its speed when it is farthest from the sun** if **angular momentum is conserved**?

Drawing **Given Info** **Formula** **Set-Up with Units**

Answer _____

8) A bowling ball with a mass of _____ **kg** and a radius of _____ **m** starts from rest at a height of _____ **m** and rolls down a _____ $^{\circ}$ **slope**. **What is the translational speed** of the ball when it **leaves the incline**?

Drawing **Given Info** **Formula** **Set-Up with Units**

Answer _____