PHY 101 **Quizzam 5** **July 8, 2021**

Name: _____

Please show all of your work, no credit will be given if there is no work. Partial credit will be given where warranted, so show me your physics reasoning. Do not forget to give units for numeric answers and use appropriate significant figures.

This quizzam is open notes and open book but not open internet, i.e. do not google the problems for solutions.You have 45 minutes to complete this quizzam. Good luck!

1. (2 points) Is it possible for a rotating body to be in equilibrium? If so, how?

2. (1 point) A pendulum hanging straight down is in an equilibrium position. Is this equilibrium stable, unstable, or neutral?

3. (1 point) Why are the forces exerted on the outside world by the limbs of our bodies usually much smaller than the forces exerted by muscles inside the body?

4. (2 points) A heavy load is being carried by a wheelbarrow. How much force must be exerted on the handles (at a distance of 1.5 m from the wheel) to lift a 35 kg load whose center of mass is 0.5 m behind the wheel? You can neglect the weight of the wheelbarrow itself.

5. (2 points) A car's wheel has a radius of 0.450 m. How much force does it exert on the road if the wheel's torque is 2500 N m?

6. (2 points) A compound pulley has a mechanical advantage of 5. What is the tension in the rope required to lift a piano weighing 300 kg?

7. BONUS (3 points) There is a drawbridge across a 50 m channel. When it is lowered, the supporting cable makes an angle of 30° with the road surface as shown (Note: the bridge is fully supported by the normal force on the left side and the tension on the right). If the bridge has a mass of 10,000 kg, what is the tension in the cable? (Hint: choose the pivot point to be the left side of the bridge.)