Accelerating Atwood Machines Final Lab and Report

Physics

This lab report is an individual assignment. It consists of two main parts: a prediction of angular acceleration (α) of an Atwood Machine, and experimental verification of your prediction. (You should work with a group when you test your prediction.) For the purposes of this lab report, since you are all using different Atwood Machines, you should use a range of moments of inertia (I) for the Atwood Machine – from a maximum of 1 x 10^{-3} (0.001) kg m^2 to a minimum of 1 x 10^{-4} (0.0001) kg m^2. This will mean your predicted angular acceleration will be represented by a range as well.

1. Predict the resulting angular acceleration of an Atwood Machine if you hang a 0.09 kg (90 g) mass from the wheel with a radius of 0.03 m (3 cm) and a 0.120 kg (120 g) mass from the wheel with a radius of 0.025 m (2.5 cm) as pictured below. The masses should cause torque in opposite directions.

2. Test your predicted range of angular accelerations using an actual Atwood Machine along with hanging masses. Discuss your results in a detailed paragraph that includes explanations of your sources of error and includes corrected or example calculations.