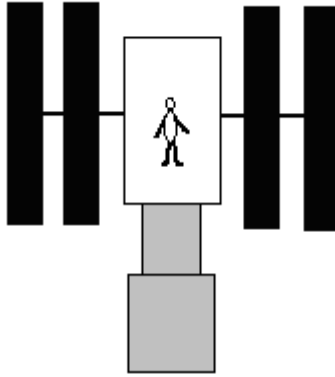


AP Physics 1 Unit #5 Pretest Problem

Name _____

Period _____

An astronaut is performing an experiment on the International Space Station. The Space Station is in a circular orbit 350 km above the surface of the Earth while the experiment is being conducted. The astronaut is located at the center of mass of the space station and therefore is in a "zero-g" environment. Answer the following questions based on this information



- 1) What is the period of the space station's orbit?

- 2) What is the linear speed of the space station?

- 4) What is the force of gravity on the astronaut?

5) If the space station were boosted into a higher orbit 400 km above the Earth would this increase, decrease or have no effect on the force you calculated in question #4?

_____ Increase

_____ Decrease

_____ No change

Explain your answer.

6) Because of the drag of the residual atmosphere there is a torque of 1000 Nm on the space station as it orbits. This torque would cause the station to rotate about its center of mass. The space station has a moment of inertia about its center of mass of $4 \times 10^6 \text{ kgm}^2$. What is the angular acceleration about the center of mass created by this torque?

7) If the angular acceleration is not corrected how long would it take the space station to achieve a rotational speed of 1 revolution per minute about its center of mass?