A gyroscope consists of an axle of negligible mass and a disk of mass $M$ and radius $R$ mounted on a platform that rotates with angular speed $\Omega$ as shown in the figure below. The gyroscope is spinning with angular speed $\omega$. Forces $F_a$ and $F_b$ act on the gyroscopic mounts. The goal of this problem is to find the magnitudes of the forces $F_a$ and $F_b$. You may assume that the moment of inertia of the gyroscope about an axis passing through the center of mass normal to the plane of the disk is given by $I_n$.

a) Calculate the torque about the center of mass of the gyroscope.

b) Calculate the angular momentum about the center of mass of the gyroscope.

c) Use Newton’s Second Law find a relationship between $F_a$ and $F_b$, the mass $M$ of the gyroscope, and the gravitational constant $g$.

d) Use the torque equation and Newton’s Second Law to find expressions for $F_a$ and $F_b$. 