PHYS 101        Circular Motion, Gravitation, and Orbital Speed

1. State Newton’s law of gravitation in equation form.

2. Write down an expression for the magnitude of the centripetal force, *Fc* in terms of the mass (*m*) and speed (*v*) of the object and the radius (*r*) of the circular path.

3. Derive an expression for the speed of a satellite (*v*) in circular orbit around Earth in terms of the universal gravitational constant (G), mass of Earth (M), and the distance of the satellite from the center of Earth (r).

4. Visit the following satellite tracking NASA website and find out the altitude of the international space station. <http://spaceflight.nasa.gov/realdata/tracking/>

Altitude of the space station = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5. Calculate the speed of the space station using the expression from (3.) above and the altitude from (4.) above. (Universal gravitational constant = G = 6.673 x 10-11 N.m2/kg2,
Mass of Earth = M = 5.98 x 1024Kg, Radius of Earth = R = 6380 km)