PHYS 211 Kepler’s Planetary Laws Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

G = 6.67 x 10-11 N.m2/kg2 ME = 5.98 x 1024kg RE = 6.37 x 106 m
Force of gravitation: $F=\frac{GMm}{r^{2}}$ Centripetal Force = $F\_{c}=m\frac{v^{2}}{r}$ ; $v=\frac{2πr}{T}$

1. State Kepler’s three laws of planetary motion.

2. A satellite is orbiting the Earth in a circular orbit of radius *r*, centered at the center of Earth. Show that the period, T of the satellite is given by the following equation:$ T^{2}=\frac{4π^{2}}{GM}r^{3}$

3. An orbiting satellite stays over a certain spot on the equator of (rotating) Earth. What is the altitude of this geosynchronous orbit?

4. A certain satellite travels in an approximately circular orbit of radius 7.1 × 106 m with a period of 6 h 20 min. Calculate the mass of its planet from this information.