

**Astronomy 45**  
**Introduction to Astrophysics**

Problem Set 7 Due April 6 , 2001

1. At what altitude above the Earth are the gravitational forces due to the Earth and the Sun equal?
2. Comet Encke has a period of 30 years. At perihelion it has a distance of 0.338 AU from the Sun. What is the eccentricity of its orbit?
3. Velocity curves of a double-line spectroscopic binary are sinusoidal with amplitudes of 20 and 60 km s<sup>-1</sup> and a period of 1.5 years. What are the masses of the two stars, expressed in solar masses? The orbital inclination is 90 ° .
4. The spectral emission lines of an eclipsing binary system shift back and forth with a period of two years. The hydrogen Balmer line at 6562.8 Å is shifted by 0.2Å for one star and by 0.1Å for the other. What are the masses of the two stars and what are their orbital radii?