PHYSICS 275 Assignment #1

Due: 20 September, 2017

Can be handed in during class or in the box beside room PHY 211

1) What is the angular size of a dime (diameter = 1.8 cm) located on top of the CN Tower in Toronto when viewed from Waterloo, a distance of 110 km? Give your answer in arcseconds. *Note: the height of the tower does not matter at all!* (Marks:4)

2) An object is in orbit around the Sun, but always more distant from the Sun then 1.0 A.U. If the time from one Opposition to the next is 2.5 years (ie the synodic period) then what is the (sidereal) period of the object's orbit? What is the semi-major axis of the object's orbit? (Marks:6)

3) If the sidereal (orbital) period of an asteroid is 9.0 years and the closest approach to the Sun of the asteroid in its orbit is 2.0 Astronomical Units (AU) what is the eccentricity of its orbit? (Marks: 4)

4) Assuming that both Mars and the Earth have circular orbits how large will Mars appear to be (ie what is its angular diameter?) (a) at Opposition, (b) at Conjunction, and at (c) at Quadrature? Assume that the radius of Mars is 3,390 km and that its orbital radius is 1.52 A.U. (Marks: 6)

(Marks: 20% of total Assignment Marks)