Physics 111 Session 18

1) Two baseballs of mass 0.4kg are 1m from each other. What is the gravitational force of attraction between them? 1.067*10^-11 N

2) What is the acceleration of gravity at a distance of two times earths radius? Radius of the earth = 6,371 km. Mass of the earth = 5.972 * 10^24 kg 2.45 m/s^2

3) What is the speed of a satellite in a circular orbit a distance of 7 million meters from the SURFACE of the earth? 5458 m/s

4) An asteroid of mass 500kg is a distance of 6,000km from the surface of the earth.

   a) What is its gravitational potential energy at this distance? 3.319 * 10^10 J
   b) When it hits the earth, what will be its speed? 11,523 m/s

5) Suppose we want a satellite to revolve around the earth 7 times every day. What radius should the satellite orbit at? Don't worry about this question for the exam

6) Given the mass of the sun is 2*10 ^30 kg, what is the force on the earth by the sun if the distance from the earth to the sun is 150 billion meters? Also, what is the speed of earth? 5.31*10^33 N, 29822 m/s

7) If I want to launch an object into space permanently from a distance 400km from the center of the earth, what speed so I have to launch it at so it never comes down? 44,628 m/s

8) The force of gravity of the earth exerts a 30N force on an astronaut of mass 60kg. What is the force that the astronaut exerts on the earth? What if the astronaut was replaced by an apple of mass 0.2kg? 30 N, 0.1 N

9) If an object in an elliptical orbit is moving around a star of mass 7*10^31 kg and is moving at 7,000 m/s when it is 7 million meters from the star, what is its speed when it is 4 million meters from the star? Use conservation of angualar momentum to solve this