1. Answer Hobson Ch 5, Ex 6,15,20,26 and Problems 3,4,6,7,8,9

2. The speed of Halley's comet, while traveling in its elliptical orbit around the sun,

   (a) increases as it nears the sun.

   (b) is constant.

   (c) is zero at two points in the orbit.

   (d) is zero at four points in the orbit.

3. The following statements refer to man-made, artificial satellites in orbit around Earth. Which is an accurate statement?

   (a) The velocity required to keep a satellite in a given orbit depends on the mass of the satellite.

   (b) Only circular orbits are possible for artificial satellites.

   (c) The period of revolution of a satellite moving about the Earth is independent of the size of the orbit it travels.

   (d) A satellite in a large diameter circular orbit will always have a longer period of revolution about the Earth than will a satellite in a smaller circular orbit.

4. You travel to a distant planet, and as part of your survey you want to discover its mass. In this question you will see how to use the motion of the spaceship around the planet to estimate this. Here are some details that may be helpful. The mass of the spaceship is 6.8×10^5 kg, and it orbits the planet with a period of 26 hours and an orbital radius of 16×10^6 m.

   (a) (i) Use the radius and period to find the velocity of the spaceship in m/s.

   (ii) Based on your answer above, find the centripetal acceleration of the spaceship.

   (iii) Using Newton's second law and the Universal Law of Gravitation, find the mass of the planet.

   (b) (i) What forces if any act on the astronauts inside the spaceship?

   (ii) Explain why the astronauts feel weightless.

   (c) The spaceship decreases its orbital radius to get a closer view of the planet. In this lower orbit will its speed be greater or smaller? Explain.