



**The
University
Of
Sheffield.**

DEPARTMENT OF PHYSICS & ASTRONOMY Spring Semester 2010-2011

THE SOLAR SYSTEM

2 hours

Answer **THREE** questions.

All questions are marked out of ten. The breakdown on the right-hand side of the paper is meant as a guide to the marks that can be obtained from each part.

1. State Kepler's laws of planetary motion. [3]
What two parameters are usually used to describe the orbit of a planet? [1]
Explain, using a diagram if you wish, how a 'gravitational assist' can be used to increase the speed of a space probe relative to the Sun. [3]
What is an 'orbital resonance'? Why is the resonance between Io, Europa and Ganymede important? [3]

2. Compare and contrast the following pairs:
a) Mars and Venus; [5]
b) Saturn and Uranus. [5]

3. Write a short description of any TWO of the following:
a) dwarf planets; [5]
b) terrestrial planet atmospheres; [5]
c) solar activity. [5]

4. Explain the differences between long- and short-period comets. Why do we think they must have different sources? [4]
Describe the structure and composition of the asteroid belt. [6]

5. Explain the core accretion model of planet formation. [4]
What was the Late Heavy Bombardment and what is the evidence for it? [2]
What do we think caused the Late Heavy Bombardment? [4]

END OF QUESTION PAPER