Astronomy 161 – Introduction to Solar System Astronomy
Winter Quarter 2010 – Prof. Martini

# Final Exam Study Guide

***Please use this Study Guide in conjunction with the Study Guides for the four quizzes. While these Study Guides contain the material I consider to be the most important, some of the other material I cover in class will still be on the Final.***

## General Advice and Information:

Please read through the "Course Objectives" on the syllabus. These objectives are the guidelines I follow to determine the material we cover in this course, as well as the material I will use to evaluate you.

The final exam will cover all of the material I have covered in class. It will contain 100 multiple-choice questions similar in style to those asked on the quizzes. Approximately one third of the questions will be about material covered since the fourth quiz and the remaining two thirds will cover the rest of the course. The Final will be in the usual classroom on the date provided on the syllabus (and set by university guidelines) and last for 1 hour and 48 minutes.

As a general rule, I strongly recommend that you are familiar with all of the concepts I list on the "Key Ideas" slide and the "Warm Up Questions" I show at the beginning of class. The "Key Ideas" slides are also part of the lecture outlines available on the class website. I strongly encourage you to become familiar with each of these topics and understand why each is important.

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**Gas Giants: Jupiter and Saturn**

Basic atmospheric composition and features (e.g. storms, belts, and zones)

Internal structure, composition, and origin of their magnetic fields

**Moons of Jupiter**

Origin of the regular and irregular satellites

Sources of heat in the outer solar system

Explanation of the similarities and differences between the Gallilean Moons

**Moons of Saturn**

Connection from surface features and composition to surface age and structure

Properties of Titan, role of methane, and prospects for life

**Ice Giants: Uranus and Neptune**

Internal structure and the role of internal heat on weather

Origin and evolution of Triton's orbit

Migration of planets in the outer solar system

**Planetary Rings**

Composition and origin of rings

Role of resonances and shepherd moons

Concept of the Roche radius

**Comets**

Basic structure, composition, and origin

**Outer Solar System**

Trans-Neptunian objects, the Kuiper Belt, and Scattered Disk

Sizes and composition of dwarf planets

**The Search for Exoplanets**

Formation of stars and planets in the Galaxy

Search techniques for exoplanets: astrometric wobble, doppler wobble, transits, and microlensing

**Strange New Worlds**

Properties of extrasolar planets and their stars

Role of selection effects in identification of exoplanets

**Life, The Universe, and Everything**

Requirements for life

Drake equation and prospects for extraterrestrial intelligent life

**Some thought questions**

1. How do the compositions and masses of the planets depend on distance from the Sun? Why is this the case?
2. What is the most plausible origin of retrograde moons? Of prograde moons confined to a disk?
3. What are the main characteristics of Titan that make it a plausible place to look for life?
4. Why was Pluto reclassified as a dwarf planet?
5. How are most stars around other stars found? What are the limitations of these studies?
6. What do scientists consider to be the three main requirements for life?
7. Where are the most likely places to find life elsewhere in the Solar System (and why)? What are some unlikely places?