ASTR1010: Astronomy of the Solar System

Test #4 Study Guide
Fall 2019

Lectures: Prof. Emmanouil Georgoulis
Website: http://www.astro.gsu.edu/~georgmk1/Astro1010-Fall-2019/

- Please make sure you have an understanding of the material in the Textbook
- Review the Chapter slides available in the course website
- Work on the practice questions, available after each lecture
- Work on the review questions, available after the November 14 practice lecture; notice that a second practice lecture will take place on November 19

The main concepts of each chapter to be examined on November 21 are as follows:

Chapter 10:

- Atmospheres of terrestrial planets: understand stratification (i.e., layering), density, temperature and how these vary with altitude
- Weather, climate and their differences
- The greenhouse effect: causes, main agents on Earth and Venus and what would happen if it did not exist
- Venus' runaway greenhouse effect: what does it explain?
- Albedo and its effect
- Earth's atmospheric structure and unique atmospheric composition
- Basic characteristics of atmospheres of Mercury, Venus and Mars
- Effects of scattered light on Earth's atmosphere: blue and red
- Earth's magnetosphere and its purposes. Magnetospheres of other terrestrial planets.
- Wind patterns, atmospheric convection, Coriolis effect and their manifestations on Earth
- Which factors can cause long-term climate change?
- Atmospheric loss and gain: how does it work?
- Why did Mars change so drastically?
- Nitrogen, Oxygen, Ozone and Carbon Dioxide in Earth's atmosphere: what is their origin and main roles?
- What would happen if sources of atmospheric oxygen ceased to exist?
- Anthropogenic (i.e., human-made) impact on the atmosphere and the greenhouse effect.
- What is global warming, how is it driven and what are its consequences?

Chapter 11:

- Jovian planets: what is their believed internal structure and how does it differ from that of terrestrial planets?
- How is internal structure of Jupiter and Saturn different than that of Uranus and Neptune?
- Why do Jupiter and Saturn have strong magnetospheres?
- What is the composition of Jupiter's and Saturn's atmospheres?
- What is weather like in Jovian planets, particularly Jupiter and Saturn?

- Jovian planet moons and their size classification: how does size affect their shape and geological history?
- Sources of heat in the moons of Jupiter and Saturn
- Jovian planet rings: origin, constitution, and shape
- What are resonances and what is their purpose on Jovian planet rings?

Chapter 12:

- Small worlds: what are the differences between asteroids, comets and dwarf planets?
- What are meteors and what are meteorites? What are meteor showers and why do they typically originate from certain areas of the sky, at certain times of the year?
- Typical asteroid structure
- Asteroids and their moons (when existing): what can we learn from them?
- Typical composition of asteroids
- Why is the asteroid belt located where it is (i.e., between the orbits of Mars and Jupiter)? What do resonances have to do with this?
- What are the Trojan asteroids?
- Which are the two meteorite types and how are they different?
- What are the typical sources of meteorites discovered in Earth?
- What are sample return missions? Can you name one?
- What is the typical comet composition?
- What is a comet's tail, where and how does it form and how many types of tails exist?
- Where do comets come from? How do we distinguish between comets from the Kuiper belt and those from the Oort Cloud?
- Why was Pluto removed from the list of planets? What is it now believed to be?
- What were the main findings of the New Horizons mission in regard to Pluto?
- Cosmic collisions: how do they occur and what is their impact on Earth and occurrence frequency in regard to their size?
- Can you name an agreed-on extinction-level event caused by a cosmic collision?
- How do we know of this major event? What is the main evidence of impact?
- How do Jovian planets affect the rate of cosmic collisions for terrestrial planets?