

ASTR1010: Astronomy of the Solar System

Test #3 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 October 24 practice lecture; notice that a second practice lecture will take place on October 29

The main concepts of each chapter to be examined on October 31 are as follows:

Chapter 7:

- A “bird’s eye” view of the solar system: ordering of planets with respect to their distance from the Sun
- Differences between planets, dwarf planets and planetesimals
- Asteroids and comets: similarities and differences
- Major types of planets: terrestrial, jovian – what are the main similarities and differences
- Asteroid belt; Kuiper belt; Oort Cloud: where are they, what are their main properties
- Four types of space missions (flyby, orbiter, lander, sample return): understand main characteristics; place in order of complexity and cost
- How do we measure distances between Earth and planets closer to the Sun?

Chapter 8:

- How did we arrive to the theory of solar system formation – what patterns should this theory explain?
- Initial solar nebula composition: what was it, and why?
- From the solar nebula to the solar system: main stages and conservation laws
- How have terrestrial and jovian planets been formed? Why do we have these two main planet types?
- Frost line: where is it – what does it mean?
- How here comets and asteroids formed?
- Accretion and formation of bodies: main acting forces at small and large scales
- The solar wind and its role
- What is the “heavy bombardment”? What is an impact crater?
- What explains peculiarities in the solar system, such as the extreme tilt of Uranus and the relatively large size of Earth’s Moon?
- The age of the solar system: what corroborates it and why? Why are we certain that the solar system could not have been formed at the initial stages of the Universe?
- Radiometric dating: why is it used; how does it work; where does it fail?

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Chapter 9:

- Differentiation: what is this process? How does this process shape the interiors of terrestrial planets?
- Main layers in the interior of terrestrial planets (core, mantle, crust): main properties – why are they ordered this way?
- What is the lithosphere? How is it different than the crust?
- How do we extract information about Earth's interior?
- What are the main two wave types which we use to learn about Earth's interior? What are their main properties?
- Why do bigger worlds (planets, dwarf planets, sizeable moons) attain spherical shapes?
- Where does interior heat in planets come from? How is this heat transferred outwards?
- Surface area to volume ratio: what does it mean – how does it affect smaller and larger worlds?
- How are magnetic fields formed in planetary interiors?
- What are the four processes shaping planetary surfaces (Impact Cratering, Volcanism, Tectonics, Erosion)? How are they initiated – where is each of them most important?
- Which of these four processes are most relevant for each of the terrestrial planets, Mercury, Venus, Earth and Mars?
- Lunar craters and maria: how have they formed – which ones are younger?
- What are martian “channels” and why were they misinterpreted as structures made by a civilization inhabiting Mars?
- Similarities between terrestrial and martian landscapes: what do they mean?
- Earth's tectonics and the theory of continental drift
- What phenomena are associated with Earth's tectonic motions? Think mountain ranges, subduction, rifts and faults, earthquakes, seafloor recycling
- Why do we believe that Mercury, Moon and Mars are geologically “dead”?