Astro 14 – Astrophysics: Solar System and Cosmology
Spring 2018
Prof. David Cohen

Second Midterm

<u>Guidelines:</u>

The exam will be held *in class* on Thursday, April 26.

It is closed-book, but students can bring one page of paper (regular, 8.5 by 11 inches) with *hand-written* notes on *both* sides. These notes can be anything (equations, words, sketches) but they have to be hand-written by the student.

Probably it is a good idea to include concepts as well as equations.

You will be provided with all necessary tables from the appendix of the textbook, including physical and astronomical constants and conversion factors, and the properties of planets and moons.

The scope of the exam will be the material from the first fifth week through the middle of the eleventh week, as detailed in the list below. The material from Ch. 24 will *not* be on the exam. Nor will the material from the second half of Ch. 23 (the material covered is up through the end of sec. 2 of Ch. 23; class 21).

Note that your sheet of notes can be the one you used for the first exam with additional things newly written on it or you can start fresh.

<u>Topics:</u>

Note that of course many of the concepts from this part of the class rely on more basic, physics and astronomy concepts from the first part of the class. For example, the inverse square law of light was covered on the first exam, but it's an important tool for measuring the Hubble constant.

Note also that the problem that turned out to be the hardest on the first exam was the one that was the most qualitative and least mathematical.

Hydrostatic equilibrium and basics of planetary atmospheres

Key properties of individual planets, Oort cloud, asteroid belt, Kuiper belt (e.g. why is Venus's atmosphere so much more carbon-dioxide rich compared to the Earths? Why are the comets in the Oort cloud in a spherical distribution?)

Formation of the Solar System and important patterns in the Solar System's properties (beginning of Ch. 12)

Exoplanets, especially techniques for measuring their properties (what can we learn from transit observations? From radial velocity observations?) (end of Ch. 12)

Beginning of cosmology: Hubble law, large scale structure, cosmological principle, lookback time, Olber's paradox, Newtonian Friedmann equation and the critical density (up through sec. 2 of Ch. 23)