

Astronomy 104

12-WEEKS EXAM REVIEW

April 12, 2004 7:15-8:30 pm 3425 Sterling

The test will consist of 50 multiple choice questions, to be completed in 75 minutes. You are responsible for all topics in lectures, discussion sections, homeworks, and material in the readings related to those topics.

75% of the questions are conceptual, 25% are recall. So when studying make sure that you are **UNDERSTANDING** ideas more than memorizing. To help you study, download the lecture notes from www.astro.wisc.edu/astro104;; make sure you can do the ConcepTests; work with friends and craft your own ConcepTests; stop by to see Marta or me with questions; and come to the **REVIEW SESSION** on **SUNDAY, 4/11, 7:30 in 3425 STERLING**. (Note: the outside doors are locked at 8:00.)

Any equations that you need will be on the exam!

Topics (through April 5)

Law of Gravity

- Galileo's experiment (dropping balls of different masses)
- Tides

Astronautics

- Physics of Orbits (including Kepler's 3rd Law)
- Weightlessness
- Physics of rocket motion, including circularization and re-entry
- Escape velocity
- Interplanetary travel, transfer orbits, and gravity boosts

Physics of Light

- Wavelength, frequency, speed
- Electromagnetic spectrum
- Doppler shift
- Photon and Planck's Law
- Spectra – continuous, absorption, emission
- Kirchoff's Laws
- Thermal radiation – Wien Law, Stefan-Boltzmann Law
- Quantum Mechanics – absorption and emission of photons by hydrogen atom
- Energy level diagrams
- Kelvin temperature scale

Telescopes

- Light gathering, dependence on diameter of telescope
- Resolution – diffraction limit and effect of atmosphere
- Atmospheric transmission and telescopes in space
- Telescope design – refractor and reflector

The Solar System

General Properties – inventory

relative distance scales

dynamical properties – orbital eccentricities, planes, directions of revolution

physical properties

Formation of the Solar System

The processes described in Figure 9-13

The Sun

Hydrostatic equilibrium

Energy flow

Radiation

Convection

Energy equilibrium and sources of energy

Gravity

Nuclear – $E=mc^2$ and proton-proton chain

Solar surface phenomena, and their impact on Earth