Astronomy 101 Section 1 **19 October, 2016**
Study Guide for Mid-term Exam 2

The second mid-term will have the same format as the first. The sample questions below provide a guide for most (but not all) of the important concepts covered in class. Students should prepare by seeing if they can answer (1) these sample questions, and (2) the review questions at the end of each chapter of their textbook. As always, the lecture notes may be more up-to-date than the text.

Sample questions

Draw a simple wave. Illustrate the wavelength and relate it to frequency and period.

What are the components of the electromagnetic spectrum, in order of increasing wavelength (decreasing frequency)? Which side of the spectrum corresponds to the most energetic photons?

Describe reflection, refraction, and diffraction.

How do the resolution of a radio and optical telescopes compare?

What advantages does a reflecting telescope have over a refracting telescope?

Why would astronomers put telescopes on mountain tops? In airplanes? In space?

What advantage does interferometry provide?

How are the temperature of a blackbody and the wavelength of maximum intensity related?

How does the total energy emitted per unit area from a blackbody depend on its temperature?

What is luminosity? How does it depend on the radius and temperature of a blackbody?

Why do gravitation and light intensity follow inverse square laws?

What is albedo?

Quantum mechanics states that the energies of atoms and molecules are quantized. How does this allow astronomers to identify elements and compounds on objects we can study only by observation?

What is spectroscopy? What can we learn from it?

What are Kirchhoff's Laws?

What is a Doppler shift, and how does it work?

What powers the luminosity of the Sun?

What is the fate of the Sun?

Make a brief inventory of the Solar System

List the eight major planets and classify them.

Compare and contrast the evidence for geologic activity on Earth, Venus, and Mars.

How have astronomers studied the surface of Venus?

What techniques are used to determine the *relative* ages of surfaces?

How do astronomers determine absolute ages for rocks on the Earth and Moon?

How does radioactive dating correct for the amount of a daughter isotope in a rock when it formed?

How do plate tectonics work on Earth? How do they explain subduction zones and rift zones?

How can we study the interiors of the terrestrial worlds?

How do the interiors of the terrestrial worlds differ?

How do the densities and compositions of the atmospheres of Venus, Earth, and Mars differ? Why?

How does the greenhouse effect work? On which planet does it have the largest impact?

What is the dominant greenhouse gas on Earth?

How do high- and low-pressure cells in planetary atmospheres rotate, and why?

What does it mean to describe evolution as fact? What does it mean to call evolution a theory?

Compare what life was like on Earth one million, one billion, and three billion years ago.

What are the dominant greenhouse gases on the terrestrial planets with atmospheres?

What evidence do we have for flowing and/or standing water on the surface of Mars?

Describe how space missions to Mars have changed our understanding of that planet. What about the rovers specifically?

What evidence points to humans as the cause of global warming on Earth?