Astronomy 1102/1104 13 March, 2009
Study Guide for Exam 2

Exam 2 will have a format very similar to Exam 1. The sample questions below provide a guide for the more important concepts most likely to appear on the exam. Students should prepare by seeing if they can answer (1) the sample questions below and (2) the review questions at the end of each chapter of their textbook. Your lecture notes will prove especially useful for the latest news from Mars and an up-to-date treatment of climate change on Earth.

Sample questions

Describe Newton's Laws of Motion.

Describe Newton's Law of Universal Gravitation.

Draw a simple wave. Illustrate what the wavelength is. What are frequency and period? How are these quantities related?

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?

Why is the sky blue? Why are sunsets red?

What is a blackbody?

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?

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 is a Doppler shift, and how does it work?

What are Kirchhoff's Laws?

Why do gravitation and light intensity follow inverse square laws?

What is albedo? What effect does it have an a planet's equilibrium temperature?

How does the atmosphere limit astronomy which can be conducted from the ground?

What advantages and disadvantages do space telescopes have compared to ground-based telescopes?

Why would astronomers want to launch telescopes into Earth orbit?

What advantage does interferometry provide?

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

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 can we study the interiors of the terrestrial worlds?

How do the interiors of the terrestrial worlds differ?

What determines the density and composition of the atmospheres of the terrestrial worlds?

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

What is the greenhouse effect? Where is it most noticeable?

What is the dominant greenhouse gas on Earth?

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

What do we know about how life formed on Earth?

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?

Describe the differences between the old and new Mars.

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

How have the Opportunity and Spirit Rovers contributed to our understanding of Mars?

Why do climatologists believe that the Earth is experiencing global warming?

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

How has improved technology changed our perception of Mars? Of Venus? Of Earth?