

Physics 174 Study Guide for Exam II

23 March, 2007

Exam II will have a format very similar to Exam I. 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, (2) the review questions at the end of each chapter of your textbook, and (3) the questions in the "Building Scientific Arguments" sections. The internet is also a good source, especially for the recent findings on Mars.

Sample questions

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?

How does a wave behave when it encounters a boundary between two media? In other words, what might a wave do at a boundary?

What are reflecting and refracting telescopes?

Why would astronomers want to launch telescopes into Earth orbit?

What advantage does interferometry provide?

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?

Why do gravitation and light intensity follow inverse square laws?

What is albedo?

What are Kirchhoff's Laws?

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 a Doppler shift, and how does it work?

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?

How do astronomers determine ages of surfaces from studying craters?

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

How can we study the interiors of the terrestrial worlds?

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?

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

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

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

What evidence did we have that water has flowed on the Martian surface before the rovers landed?

What are the most significant findings of the Opportunity and Spirit Rovers on Mars?