

Physics 174
Study Guide for Exam I

16 February, 2007

The actual exam will consist of 50 multiple choice questions. An exam consisting of short-answer and essay questions would be preferable, but grading it quickly in a class this size is not practical. If the exam were to take this form, it would include questions like those below. Your textbook provides excellent questions in **bold face** in the "Building Scientific Arguments" sections scattered through the chapters, as well as good review questions at the back of each chapter. If you can answer all of those questions, and the ones below, then you have mastered the material.

Explain why science is better described as a process instead of a body of knowledge.

What is a scientific theory?

How do scientists choose among competing hypotheses?

Have scientific laws been proven? Explain.

What needs drove the development of astronomy in the earliest stages of human civilization?

How did Egyptian and Mesopotamian astronomy differ, and why?

How did Mesopotamian and Greek astronomy differ, and why?

How and why did Mesopotamian civilizations develop astrology? How did this spur the development of astronomy?

Given a latitude on Earth:

What is the altitude of the celestial pole above the horizon?

How high above the horizon is the celestial equator where it crosses the meridian?

How high does the Sun get on the longest day of the year? The shortest?

Describe the path of the Sun with respect to the background stars. What are the key points along this path, and how are they related to the seasons?

What causes the seasons? Use the modern view of the Solar System to explain.

Describe and explain the phases of the Moon as it completes one orbit around Earth.

What circumstances produce a lunar eclipse? A solar eclipse?

What is an eclipse family?

Describe the motion and behavior of a superior planet with respect to the background stars.

What is an arche? Give some historical examples of attempts to identify it.

Give five arguments for a spherical Earth.

How are the accomplishments of the following philosophers relevant to this course?

Thales

Pythagoras

Empedocles

Plato

Aristotle

What did Eudoxus contribute to astronomy?

How did Eratosthenes measure the circumference of the Earth?

Explain how Aristarchus estimated the relative distances of the Sun and Moon. Why was his estimate inaccurate?

What other measurements did Aristarchus make?

Why is Hipparchus considered the greatest of the Greek astronomers?

What are the tools that Ptolemy used to model the motions of the planets? How did he apply them?

How are astrological beliefs tied to a geocentric model of the Solar System?

Describe the following models of the Solar System. How do they account for the behavior of the planets? What do they fail to explain?

The geocentric model of Aristotle

The geocentric model of Ptolemy

The heliocentric model of Copernicus

Compare the Ptolemaic and Copernican systems in terms of the accuracy of their predictions and the ease of computation. What arguments led some people to support the Copernican system?

What happened when the lost Greek classics were reintroduced to Medieval Europe?

How did Aristotle's world view become dogma?

List Galileo's key observations and how they contradicted prevailing beliefs about the heavens.

What were Tycho Brahe's biggest contributions to astronomy?

Describe Kepler's Laws.

Describe Newton's Laws of Motion.

Describe Newton's Law of Universal Gravitation.