

PHYS 1304 Midterm Review Sheet

The format of the midterm will be much like the quizzes that you have been taking with 10 short answer questions that can include both concepts and mathematics. In many ways they will be like the quiz questions. One thing that will be different from the quizzes is that I will not be providing you with formulas and constants. Instead, you are allowed to bring in a single 8.5x11 sheet of paper with whatever notes you want on it. Obviously, including all the formulas and constants on the sheet will be a high priority. It is also very highly recommended that you bring a calculator as there will be math problems and not having a calculator could slow you down significantly.

The midterm can cover any material that was presented in lecture or in the reading from the first half of the semester. Below is a list of major topics that we have covered as well as a rough description of what you might be expected to know about those topics. I cannot promise that this list is inclusive, nor can I possibly get one question from every topic on the test since there are only 10 questions.

Perspective on the Universe – You need to know what the structures in our Universe are (solar system, galaxy, Universe) and what the relative scale of each of them is.

Motions of the Earth and Sky – Understand the various motions of the Earth through the Universe. You should also know how these motions manifest in the motion of objects in our sky. This includes not only the stars (including the Sun), but planets and the Moon as well. As you might guess, I could ask you to estimate these motions given certain information or do unit conversions on speeds.

Seasons – Know why we have seasons on the Earth. This is intertwined with the idea of motions. You need to understand the implications of the tilt of the Earth's axis in general.

Astronomy in Ancient Science – Understand why astronomy was significant to ancient people. Know what the Greeks did that was significant to astronomy and the advance of science in general.

Copernican Revolution – Know the major figures in the Copernican revolution and what each did. That includes Kepler's laws which you should be able to both describe and apply.

Modern Science – Know what distinguishes science from non-science and be able to apply that.

Matter and Energy – You need to know the fundamentals of matter and energy. This includes formulas, units, and unit conversions. Understand what happens to energy in different processes.

Atoms and Phases of Matter – You need to understand that atomic description of matter and how it explains things like the different phases of matter. Also have some idea about the internal structure of atoms. That includes numbers of electrons, protons, neutrons, and the energy states of electrons.

Linear Motion and Newton's Laws – Understand linear momentum and what it means that it is conserved. Know Newton's laws and how to apply them.

Angular Motion – Understand angular momentum and the implications of the fact that it is conserved.

Gravity and Tides – You need to understand Newton's description of gravity, how Kepler's laws fall out of that description, and how it results in tides. Know about tidal forces and how they have impacted the Earth and Moon in the past and present.

Light – You need to understand how we get as much information from light as we do. Know that light is both a particle and a wave. Understand the spectrum of light and how wavelength, frequency, and energy are related for light. Understand the basics of both thermal emission and line emission and absorption. Also be able to apply or explain Doppler shifts and the information we can get from them.

Telescopes – Understand how telescopes work. You need to know why having bigger telescopes is helpful to astronomers. Also know about the impact of the atmosphere on observing and how we get around that.