

# ASTR/PHYS 1060 Midterm 1 Study Guide

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**Exam Sept. 19th, 2019, in JFB 101, last 50 minutes of class**

Multiple Choice: 75% (25 questions, 3 points each)

Short Answer: 25% (5 questions, 5 points each)

## Our Place in the Universe

- What is our cosmic address?
- How large is the universe? How old?
- What are the components of the scientific method, and how does it work?
- How do you express very big or very small numbers in scientific notation?

## Sun, Moon, and Earth

- How does the night sky change based on your location on the Earth?
- Why do stars rise at different times during the year?
- What causes the seasons?
- What causes solar and lunar eclipses?
- How do lunar phases work?

## Kepler, Newton, and Orbits

- What are Kepler's 3 laws?
- What are Newton's 3 laws?
- How does Newtonian gravity work?
  - How does its strength depend on the masses of objects?
  - How does its strength depend on the separation of massive bodies?
- What's the difference between bound and unbound orbits? What critical value separates them?

## Light and Telescopes

- What are the different wavelength regimes (radio, X-ray, etc.) of the electromagnetic spectrum? How does the transparency of the atmosphere vary for them?
- What is the difference between a blackbody spectrum, emission lines, and absorption lines? How are they produced?
- What is the Doppler shift? How does it cause light to get redshifted and blueshifted?
- What is the diffraction limit of a telescope? What does it imply for telescopes working in different wavelength regimes?

- What's the difference between a refracting and reflecting telescope? Which do professional astronomers use today? Why?

## **Formation of Stars and Planets**

- What causes gas clouds to form stars?
  - Why do they form disks?
  - Why do they get hot (before fusion begins)?
- How do planets form around stars? What evidence do we have of that?
- What techniques do we use to find planets around other stars? How do they work?