Handout 14
Friday, 05 May 2006

# Final Exam Jeopardy Review

*Note: Your studying should not be limited to this worksheet. This worksheet covers many of the important points, but you should be familiar with all the material covered in the course slides.*

## Celestial Motions

1. Explain the phases of the moon.
2. Explain the geometry of a lunar eclipse.
3. Explain the geometry of a solar eclipse.
4. Explain the cause of the seasons.
5. What is retrograde motion?
6. Explain the cause of the tides.
7. What are circumpolar stars?
8. Describe the path of the Sun (at Berkeley) over the course of a year.
9. Why do we see different constellations at night over the course of the year?

## Solar System

1. How did the Moon form?
2. What are some general trends found in terrestrial planets?
3. How do we think the solar system formed?
4. How does the Greenhouse Effect work?
5. Why do we think there was once liquid water on Mars?
6. Name several trends found in Jovian planets.
7. Where, for the most part, do we find small bodies in the solar system?
8. What's the composition of cometes and what are their tails like?
9. What is the Roche limit?
10. What is a "falling star"?

## Light

1. What are the axis labels for a spectrum?
2. How is it that light allows us to see into the past?
3. Name two types of electromagnetic radiation with wavelength shorter than visible and two with longer.
4. How does wavelength relate to energy?

5. Explain the conditions for absorption lines versus emission lines.
6. How much more energy per second (luminosity) does a 3000 K star emit than a 2000 K star?
7. What is the only factor that creates a Doppler shift?
8. By what factor does the amount of light collected by a 5-m diameter telescope differ from that of an 8-m telescope?

**Sun**

1. What's the Sun's photosphere?
2. What's the Sun's chromosphere?
3. What's the Sun's corona?
4. Why do sunspots appear dark?
5. What is the solar wind?
6. What is a solar flare? What is a prominence?
7. What is the Sun's magnetic cycle?

**Stars**

1. How is a star's spectrum similar to a blackbody? How is it different?
2. What can we learn from a star's spectrum?
3. What are the spectral classfications of stars?
4. Which spectral classification has the longest lifetime?
5. What is parallax? What are its limitations?
6. What's the difference between apparent brightness and luminosity?
7. What is the inverse square law for brightness?
8. What the main features of the temperature-luminosity diagram?
9. Why are cool red giant stars also very luminous?
10. What do the stars in a binary system orbit?
11. What are two types of stars clusters and their differences?
12. Why are clusters useful for studying stellar properties?
13. How can you tell the age of a cluster?
14. What is a pre-main sequence star? Where does it get its energy?
15. What's a brown dwarf?
16. Where does a main sequence star get its energy?
17. When does a star leave the main sequence?
18. How do stars with $M < 8M_{SUN}$ die?
19. How do stars with $M > 8M_{SUN}$ die?

20. What's a planetary nebula?
21. What's a white dwarf?
22. What's a nova?
23. What's a supernova? What are the two types?
24. Why are supernovae important for the creation of life as we know it?
25. What's a neutron star?
26. What's a pulsar?
27. What's a black hole?
28. What are some effects of general relativity that we expect to happen near a black hole?
29. How do we "see" black holes?

**Galaxies**

1. Describe the structure of the Milky Way.
2. What does the Milky Way look like in our sky?
3. What are the types of nebulae we see in the Galaxy?
4. What does the rotation curve of the Milky Way look like? What does it tell us about the distribution of matter in the galaxy?
5. Why don't the spiral arms wind up?
6. What are the two main types of galaxies?
7. Are galaxies randomly distributed through space?
8. What is dark matter?
9. What is gravitational lensing?
10. What do distant galaxies look like compared to nearby ones?
11. What are quasars?
12. What's the best observational evidence for a supermassive black hole at the center of the Galaxy?

**Cosmology**

1. How did we discover that the Universe is expanding?
2. Is a blueshifted object moving towards us or away from us?
3. What is Hubble's Law?
4. What is the redshift of a galaxy with an emission line observed to be at 9200Å, if that line measured in a lab on Earth is at 8000 Å? What is the distance if we take the Hubble constant to be 75 km/s/Mpc?
5. What is Olbers's Paradox?
6. How is the Big Bang theory supported by Hubble's Law?
7. Why does it not make sense to define a spatial center of the Universe?
8. What are standard candles?

9. Is the Hubble constant actually constant?
10. What is the critical density?
11. How might you measure a deceleration of the Universe?
12. What did distant-supernova studies discover about the Universe?
13. What is the steady-state theory?
14. What is the cosmic microwave background and what does it tell us about the early Universe?
15. What two elements were mainly constructed just after the Big Bang?
16. What are a few things that the Big Bang theory predicts well?
17. What observations does the Big Bang theory fail to explain?
18. What are some of the predictions of inflation?
19. What caused inflation?
20. If inflation occured, how much of the Universe can we actually observe?
21. What's one theory for how inflation began?

**Extrasolar Planets**

1. What techniques have been used to detect extrasolar planets?
2. Why can we only detect the minimum mass of an extrasolar planet?
3. Why have the systems we've discovered shed doubt on our understanding of planet formation?