

Bring a Scantron 883 for the exam. You may use notes written on one standard, pre-cut, 3x5-inch index card, written in your own hand; you may use both sides.

Galaxies (Study Notes: Galaxies; Lecture-tutorial "Galaxy Classification"; Reader 40.)

1. Compare galaxies, galaxies clusters, and superclusters.
2. Compare the different types of galaxies.
3. Name the three spiral galaxies in the Local Group.
4. Compare star production in elliptical versus spiral galaxies.
5. What does Hubble's Law say? What is Hubble's constant?
6. What is redshift? How does the speed relate to the redshift of a galaxy?

The Milky Way Galaxy (Study Notes: Milky Way; Lecture-tutorial "Milky Way Scales")

1. Diagram the structure of the Galaxy. Locate the Sun. Identify where the most star formation takes place.
2. Discuss the formation of the spiral arms.
3. Describe: Globular clusters. Open clusters, Diffuse Nebulae, Planetary nebulae, Supernova remnants.
4. Discuss the evidence for a supermassive black hole in the center of the Galaxy.

Dark Matter (Lecture-Tutorial "Dark Matter"; Astropedia Ch. 15: "Dark Matter in the Milky Way" & "Dark Matter in Galaxies")

1. What is dark matter? What might be a better name for it?
2. What is the evidence for dark matter in galaxies? in galaxy clusters?
3. What are MACHOs and WIMPs?
- 4.. What is the most likely explanation for dark matter?

Stars (Study Notes: Stars; Reader 37, Reader 38.1. L-T: "Parallax and Distance", Problem Set 3)

1. Diagram how to measure the distance to stars using the method of stellar parallax. Discuss how the parallax and distance are related. Calculate the distance to a star given its parallax.
2. Define absolute brightness.
3. Explain how the absolute brightness, apparent brightness, and distance are related by the Inverse Square Law. Estimate the distance to a star given its absolute brightness and its apparent brightness.

Thermal emission (Study Notes: Stars. Lecture-tutorial "Blackbody Radiation".)

1. Describe thermal or blackbody emission. Know what kind of EM waves are given off by a star, by a planet, and by interstellar dust.

2. Explain in plain English Wien's Law
3. Explain in plain English Stefan's law (the Stefan-Boltzmann Law).
4. What determines the color of a star?