Outline of Course Material: Test 4 (Keyed to the Textbook)

Since the material covered in test #4 comes from different chapters of the text. I am listing the material in the order it was covered in lecture. The numbers refer to the chapter and section in the text.


22-2 Evolution of Massive Stars: Neutron stars, Type II supernovae, neutrino emission, Chandrasekhar limit, ejection of heavy elements into the interstellar medium, and observation of supernovae remnants.

22-3 Pulsars and the Discovery of Neutron Stars: Anthony Hewish and Jocelyn Bell, lighthouse model of pulsar emission, the Crab Nebula.

22-4 The Evolution of Binary Star Systems: Recurrent novae, interacting binary stars, mass transfer, accretion disk. Type I supernovae, X-ray bursters.

23-1 Principle of Equivalence: Read for information. The main idea is that light is affected by gravitational fields.

23-2 Spacetime and Gravity: Read for information. The main idea is that mass affects the curvature of space. Figure 23.6 is a useful visual picture.

23-5 Black Holes: Read carefully and know the boldface and italicized terms. Schwarzschild radius, event horizon, singularity

23-6 Evidence for Black Holes: Read carefully. X-ray binaries, Cygnus X-1, accretion, supermassive black holes, M87.

25-2 Types of Galaxies: Read carefully and know the Hubble classification scheme. Know the boldface and italicized terms. Spirals, ellipticals, dwarf ellipticals, irregulars, etc. Table 25.1 is a useful summary.

27-1 The Distribution of Galaxies in Space: Read carefully and know the boldface and italicized terms. Local Group, Local Supercluster, cluster vs. supercluster, spherical vs. irregular clusters, voids, walls, large scale structure, homogeneity, isotropy.

27-2 The Evolution of Galaxies: Observations -- Read carefully and know the boldface terms. Compare and contrast stellar populations of spiral and elliptical galaxies. Effects of collisions on gas in clusters of galaxies. Mergers and galactic cannibalism

25-4 The Extragalactic Distance Scale: Read carefully. Tully-Fisher relationship, Type I supernovae.

25-5 The Expanding Universe: Hubble's Law, redshifts, Hubble constant, the expansion of the universe. How does the redshift give the distance to a distant galaxy?

28-1 The Age of the Expanding Universe: Read carefully and know the boldface terms. big bang, Hubble time, cosmological constant, deceleration and the age of the universe

Omit 26-1 Quasars: Read for information. What is a quasar? Why was their luminosity a puzzle when they were discovered?
Active Galaxies: Read carefully and know the boldface and italicized terms. Nuclei of galaxies, jets, radio lobes, Seyfert galaxy, active galactic nuclei.

The Power Behind Quasars: Read carefully. Why were quasars more common in early universe? What is the "central engine" driving the quasar? How do supermassive black holes form?

Gravitational Lenses: Read for information. What is the connection between gravitational lenses and the possible existence of dark matter.

The Evolution of Galaxies: Theories -- Read for information. Refer back to The Blue Galaxy Mystery in section 27-2. The Hubble Deep Field.

A Universe of Dark Matter? Read for information. Large scale motions of the galaxies. The role of dark matter in the evolution of the galaxies.

Test #4

Study Tip: If you have not noticed by now, it is a good idea to read the summary at the end of each chapter to get a synopsis of the key ideas and definitions of the boldface terms in each section.

Names to Know:

- Hubble
- Slipher
- Jocelyn Bell
- Chandrasekhar
- Tully-Fisher