ASTR100 Fall 2009: Final Exam Review Sheet

EXAM IS TUESDAY, DECEMBER 15th, all chapters!

Resources available

A] http://www.astro.umd.edu/~ssm/ASTR100/ has some useful links.
B] GO OVER PREVIOUS HOMEWORKS AND MIDTERMS!
C] **Read the book!** Try the problems at the end of each chapter.
D] Email me if you have a specific question I could answer online.
E] MAKE SURE to go back to Exam #2 review sheet.

This review sheet does not cover chapters 5-11!!

Describe our place in the Universe: Earth, _____, _____, _____, _____, Universe.

Draw a picture of the Earth within its celestial sphere. Label celestial equator, ecliptic, and north celestial pole.

Draw a picture of the local sky model (hemisphere), with labels for zenith, meridian, and horizon.

Why do we see different phases of the moon? _____
_____
_____.

Draw the positions of the Earth, moon, and Sun relative to each other during:

a. Lunar eclipse

b. Solar eclipse

List Kepler's Laws of Planetary Motion: 1. _____
2. _____
3. _____

List Newton's Laws of Motion: 1. _____
2. _____
3. _____

What is the minimum mass to make a star (Hydrogen fusion)? _____
What is the minimum mass to have the CNO cycle in the core? _____
What is the min. mass of a white dwarf? ____ What is this limit called? _____
What is the minimum mass of a typical black hole? _____

Describe the life cycle of a low-mass star. _____
_____
_____

Put these phases of a high-mass star's life in order:
___ Becoming a supergiant star
___ double shell burning
___ supernova!
___ CNO cycle within the core of the star (main sequence)
___ creation of a neutron star or black hole
___ multiple shell burning down to an inert iron core

How does a binary system lead to the production of a string of novae? _____
_____
_____

What is the difference between a Type Ia supernova and a Type II supernova? _____
_____

What is the difference between a Type Ia supernova and a nova? _____
_____

	White Dwarf	**Neutron Star**	**Black Hole**
Comparable size	Size of planet		
Mass (range, limits)		~ 2-3 solar masses	
What "holds it up"?			Nothing. Gravity wins!
How were they discovered/detected?			

How did the Milky Way galaxy form? Remember the terms protogalactic cloud, halo, bulge, disk: _____
_____
_____

Describe the difference between population I and population II stars: _____
_____
_____
_____

What are the three types of galaxies? 1) _____, 2) _____, and 3) _____

List the steps in the distance ladder: _____, parallax, _____, _____, _____, Hubble's law.

Describe why Cepheid variable stars and Type Ia supernovae (white dwarf supernovae) make good standard candles: _____
_____
_____

What evidence do we have for the existence (or need for the existence) of dark matter?
_____
_____
_____

Dark matter is often grouped into categories: Baryonic dark matter (MACHOs), hot dark matter (e.g. neutrinos), and cold dark matter (WIMPs). Describe these categories and list some examples of MACHOs and WIMPs: _____
_____

How is the critical density used to determine the fate of the universe? _____
_____
_____

Name the three main possible geometries of the universe and their "fates": 1. _____ --> _____; 2. flat --> _____; 3. _____ --> coasting.

We added a fourth possible fate of the universe, accelerating after much evidence suggested this.However, we needed to explain how this was possible. What did we have to add to the picture to explain this? _____

Which elements were made in: a) big bang nucleosynthesis? _____
b) the cores of stars? _____ c) in supernovae? _____
_____ d) in the laboratory? _____.

Review the early universe timeline on pages 478-479. What *is* the microwave background? _____

EQUATION BANK

For each equation, know what the name of the equation is (where applicable), what the units of the variables have to be (e.g. $P^2 = a^3$), what context they are used in, and how to use them in ratios (as we have done all semester).

$F = GM_1M_2 / d^2$

$\lambda * T = 2.9 * 10^6$ nm*K

$L = 4\pi R^2 \sigma T^4$

$b = L / 4\pi d^2$

$P^2 = a^3$

$P^2 = 4\pi a^3 / G(M_1+M_2)$

$\lambda * f = c$

$E = mc^2$

$M_r = rv^2 / G$

$V = H_0 * D$