Review of the Exam

This will involve concepts discussed in the class notes (including my own additions) as well as the book itself – this will in general be slightly more involved than the notes I handed out in class.

Basic concepts involve

1. **familiarity with SI units of energy (Joule), power (Watt), mass (kilogram).**
2. **familiarity with scientific notation (exponential notation).**
3. **all the topics which we have discussed up to now**
    a. **the Galaxy – its basic properties, a galactic year, etc.**
    b. **the Drake Equation (this includes the early searches for extraterrestrial intelligence), as well as the various terms associated with it.**
    c. **Stars:**
        i. **The main sequence and the mass-luminosity relation of stars.**
        ii. **The sun's structure and evolution. This involves, for example, the nuclear reaction that occurs in the sun while it is on the main sequence, as well as its eventual evolution**
        iii. **The properties of degenerate matter.**
        iv. **Concepts of brightness, luminosity, and distance. Brightness is an informal definition of power/unit area.**
        v. **The energy-frequency and energy-wavelength relations of photons (light particles). Remember Planck's constant.**
        vi. **Why certain stars are favorable or unfavorable for the development of intelligent life.**
    d. **Planets**
        i. **How stars and their star systems. I may have a question on the test regarding a numerical answer on how quickly they form.**
        ii. **The (previously accepted) theory of planetary formation.**
        iii. **Problems with the current theories of planetary formation – before the discovery of planets.**

iv. **The effects of large planets and, in general, the solar system environment on the development of life on this planet.**
v. **The various detection methods for planets – this includes the main techniques, as well as more exotic techniques (that have not yet been as promising detection-wise).**
vi. **Atmospheric evolution and basic climatology.**
vii. **Important cycles and feedback loops in planetary climate theory.**
viii. **The Continuous Habitable Zone and other aspects of life around star systems.**

e. **The Origins of Life**
   i. **Important characteristics of life (chemical and structural) on Earth right now.**
   ii. **Experiments regarding the detection or characterization of life.**
   iii. **Prebiotic evolution of life.**

f. **Life in the Solar System**
   i. **Other candidate locations for the existence of life – and why this is so.**
   ii. **Characteristics of other locations of life.**
   iii. **The Viking experiment on Mars – and the detection of life there.**