Study Sheet for Astronomy: Life in the Universe FINAL EXAM March 15, 2011 8-10am

The final exam will list 4 essay questions, from which you must answer TWO.

The multiple choice section will be just 20 questions (Tests 1 ,2 & 3 had 40 questions). Each multiple choice question will count towards ONE POINT. The Essay remains 10 (5+5) points for a total of 30 points.

ALL questions, Multiple Choice and Essay, draw ONLY from the following 15 learning objectives:

1. Describe two benefits to studying life and its beginnings on Earth, before searching for life elsewhere.
2. Provide three characteristic examples of the differences between the methods of science and pseudo (non-)science.
3. Describe the Big Bang theory, what is expanding in the universe and what is not, and list three pieces of scientific evidence supporting it.
4. Label and describe the four stages of solar system formation, as outlined in the current scientific theory called `nebular theory’.
5. List the name of the three basic rock types (or classes), and describe how they are physically formed. Expand by explaining which type is likely to hold fossils and why.
6. Give the age of the Earth and how it is determined. Explain how Earth got its atmosphere and oceans and why life would have trouble surviving during the first half billion years after Earth formed.
7. List the two kinds of plates (or crusts) on earth and the terms for the three main plate interfaces as these plates move around the surface of earth. Describe what happens at these three plate boundaries.
8. Draw a diagram of the CO2 Cycle and explain how its negative feedback response to change (either higher or lower temperatures) has maintained the Earth’s temperature at a moderate, steady value
9. List 5 of the 6 key properties scientists say appear to be shared by most or all living organisms in Earth.
10. Explain how gene mutation occurs, and how it provides the basis for the evolution of species. Give an example of a beneficial mutation.
11. Describe the evidence which indicates the presence of early life (3 distinct findings) what it was and how long ago the life was thought to have existed.
12. Compare and contrast the Martian atmosphere and weather properties with those of Earth’s (how they are similar and how they are different). Describe what has lead to those differences.
13. Explain the role of Mars’s small size in relation first to the loss of its warm and wet climate and then second to its eventual loss of surface water. Provide an argument for life having developed on Mars based on its similarity to Earth the first 2 billion years.
14. Explain the three key requirements for life found at the base of the Europan ocean that could support the origin of simple life. List which key requirement is likely insufficient to sustain abundant life (like as seen on Earth’s ocean bottom) and why?
15. Explain why and how the sample of exoplanets found thus far has altered slightly our idea of how solar systems form and evolve. Describe the observational plan for (almost) proving LIFE exists on exoplanets. (from Class 14)