ESS 200 Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Astronomy Test (Stapleton)

Extended Response Questions

1. Five billion years ago, our solar system was a cold, slowly-turning cloud of dust and frozen gases (a nebula). Today our solar system is a star (our sun) surrounded by four rocky inner planets and four gas giant outer planets. Describe and explain each of the steps in the process that has transformed our solar system in the manner described above. For each step in the solar system’s formation, identify the change that occurred and the cause of that change.

2. Scientists believe that, early in its formation, the Earth was homogeneous (materials mixed evenly together) and liquid (due to its high temperature), and that the Earth had no surface water and no atmosphere. Today we understand that the Earth has a solid surface and interior layers of different materials. Most of the Earth’s surface is now covered with water, and our atmosphere has a great deal of oxygen. Identify the cause of each of the changes described above.

3. Tell the story of our Sun from the present through its final fate. Name each of its stages and explain what causes each transition between stages. For each stage, identify the Sun’s primary fuel (if any). [You can leave out the *planetary nebula* stage.]

4. Identify ways in which the life cycle of a very large star (25 solar masses) is different from our Sun’s life cycle (see previous question).

5. Briefly describe the Big Bang Theory and provide two pieces of evidence supporting the theory.

6. Sketch a Hertzsprung-Russel diagram. Label the axes to show the directions of increasing/decreasing values. On your diagram, label examples of all of the specific stars, and classes of stars, that we have discussed in class.

7. Where did matter come from? Describe all of the important sources of the matter that exists on the Earth today. Identify the specific process that created each category of matter.