

ASTR 121: Homework 8

Due Thursday, November 5th, 2009

For problems of a mathematical nature, show all work for full credit (including multiple choice responses).

1. (10 pts) Which of the following is **NOT** a reason why Earth's atmosphere has changed throughout its history?
 - (a) Formation of plant and animal life on Earth.
 - (b) Increase in the number of solar flares.
 - (c) Introduction of larger quantities of greenhouse gases by humans.
 - (d) Reduction of plant life.

2. (10 pts) **True or False:**
 - i The Big Bang created *all* of the present-day elements, the most abundant element being Hydrogen.
 - ii Part of the reason why terrestrial planets are small is a result of their heavier-element composition.
 - iii Conservation of angular momentum causes the solar nebula to spin more slowly as it contracts.
 - iv The astrometric method helps astronomers discover changes in stellar positions as a result of orbiting planets.
 - v The cores of the innermost terrestrial planets are mostly iron because heavier elements in planetesimals accumulate first.

3. (10 pts) The Earth's temperature is *constant* because
 - (a) the Earth *absorbs* and *re-emits* 100% of incoming solar radiation.
 - (b) of global warming.
 - (c) because the Earth's atmospheric clouds reflect some of the incoming sunlight.
 - (d) because the rate at which the Earth emits energy is the rate at which it absorbs energy from the Sun.
 - (e) of both (c) and (d).
 - (f) of both (a) and (d).

4. **(10 pts)** Which of the following is a true statement about categories of rocks?
 - (a) Sedimentary rocks are formed as a result of severe conditions altering both igneous and metamorphic rocks.
 - (b) Marble is one form of metamorphic rock, and limestone is one form of sedimentary rock.
 - (c) The sedimentary rock, basalt, is the primary rock which composes the ocean floor.
 - (d) Feldspar is a rock.
5. **(10 pts)** Write down the two solar nebula hypotheses, and briefly describe each.
6. **(15 pts)** Explain how the transit method allows us to determine compositions of extrasolar planetary atmospheres.
7. **(15 pts) Fill in the blanks:**

Supersonic particles from the solar wind become subsonic at a boundary called a(n) _____. Most of these charged particles remain in the magnetosphere, but some of them leak through and become trapped in rings around the Earth called the _____. When particles begin to overload the magnetosphere, they cascade down into the upper atmosphere, collide with atmospheric particles, causing _____.
8. **(20 pts)** Draw and label the layers of Earth's interior and draw and label the layers of the Earth's atmosphere on the same drawing.