Astronomy 4 Spring 1997

The Development of Astronomical Thought

Midterm Examination
25 April 1997
65 minutes, 100 points)

Part I: Answer the following ten questions with a sentence or a diagram each (4 points each).

1. Draw or describe what happens on the spiral in Chaco Canyon during the summer and winter solstices.

2. What is precession? How might this phenomenon have affected the invention of the zodiacal constellations between 6000 and 2000 B.C.E.?

3. Why, according to Bohr's atomic theory, is a chemical element's emission spectrum its unique "fingerprint?"

4. List at least two differences between the Homeric (mytho-poetic) and the Pre-Socratic views of the cosmos.

5. Why did Newton require the active participation of God in the "Newtonian cosmos?"

6. Why is the earth oblate at the poles?

7. List at least two reasons why Kepler's Mysterium cosmographicum (1597) is important for the history of astronomy?

8. Why, according to Newton's law of universal gravitation, do you weigh less on the surface of the Moon than on the surface of the Earth?

9. Describe how stellar parallax can prove the motion of the earth.

10. What assumptions did William Herschel make in order to formulate his picture of the shape of the cosmos?

Part II: Answer the following four short essay questions with a paragraph each (15 points each)

11. Compare the explanations of Galileo, Kepler and Descartes of gravitational phenomena.

12. Discuss the five possible answers to the "problem of creation" presented in various creation myths of ancient cultures.

13. How did Ptolemy and Copernicus each "save the phenomena" of retrograde planetary motion? Use well-labeled diagrams to support your answer.

14. Discus the rise and fall of the idea of "crystalline spheres" in Western astronomy, from Anaximander to Newton.