ASTRONOMY 150 – FINAL Name: _____

June 12, 2002 – Spring 2002 TA's Name & Section: _____

Answer all questions in the space provided. If you have any questions, raise your hand. 100 points possible. No calculators.

1 (10 pts) Explain why the density of terrestrial worlds decreases as you move farther from the Sun.

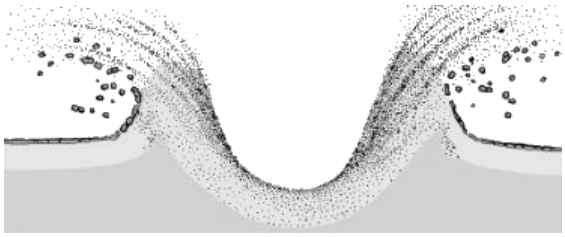
2 (4 pts) Explain why you would never see Mercury or Venus at midnight on a clear night in the skies of Seattle.

We have seen that Jupiter has had a profound influence on our Solar system. For each of the following facts about our Solar system, explain how Jupiter contributed to bring about that fact.

3 (6 pts) Io is the only solid surface in our Solar system with no impact craters on it.

4 (6 pts) Earth occasionally gets hit by meteorites.

5 (8 pts) The asteroid belt has asteroids composed of carbonaceous chondrite material.



Impact craters have played a large role in this class. Explain the role that impact craters have in:

6 (5 pts) Determining the age of Callisto's surface.

7 (5 pts) Determining the thickness of Europa's ice crust.

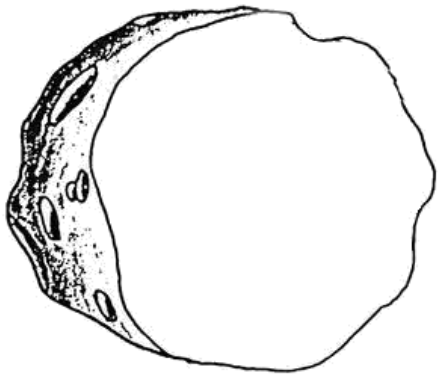
8 (5 pts) Determining the composition of the subsurface of the Moon.

9 (6 pts) Recent findings by the *Mars Global Surveyor* spacecraft suggest that Mars once had a magnetic field like the Earth [Mars does not currently have a magnetic field]. In order to generate a magnetic field, what had to have been different about Mars in the past as compared to now?

10 (6 pts) Explain why the surface of the Earth would probably be a very hard place for life to survive without Earth's magnetic field.

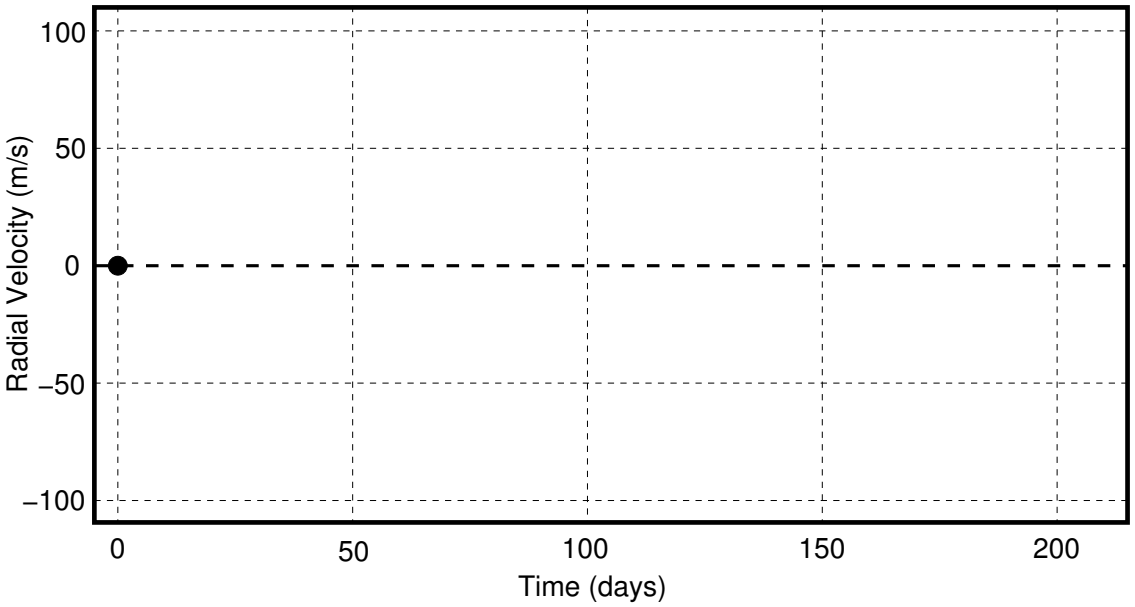
11 (6 pts) I said that Pluto is not really a planet in the classical sense, but that it is the largest object in the Kuiper Belt. Explain why Pluto should be considered a Kuiper Belt object.

12 (6 pts) We learned that there are three broad categories of meteorites: Stony, Stony-Iron, and Iron. On the cross-section of an asteroid below, indicate where in the asteroidal parent body they originated.



13 (6 pts) We have never imaged a volcano on an asteroid. How do we know that there was volcanic activity on the surface of some asteroids?

14 (5 pts) What causes most of the gaps in Saturn's rings?



The table on the right shows the observational data for two planets orbiting a star just like our Sun.

Planet	Period [Days]	Maximum Radial Velocity [m/s]	Mass [Jupiter = 1]	Distance [AU]
A	50	100	1.7	0.26
B	200	10	0.3	0.67

15 (8 pts) On the graph above, draw how the radial velocity of each of the two planets would change over 200 days of observations (label each line). Assume that the planets have a radial velocity = 0 m/s on Day 0.

16 (6 pts) Explain which of the two planets would be the easier to detect.

17 (2 pts) And finally, list the top 100 objects in the solar system.